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VETERINARY MEDICINE SERIES

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SPECIAL CATTLE THERAPY

BY

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PREFACE

Special Cattle Therapy was written to fill the demand for a concise, practical treatise on the treatment of the commoner diseases of cattle.

As in "Special Veterinary Therapy" no particular system of medicine is advocated, practical procedures only being given attention; especially, such treatments and methods of handling as the author's experience has suggested as being successful.

While every effort has been made to harmonize all procedures with the teachings of veterinary science as far as is consistent, scientific teachings have been sacrificed where the ultimate result has demanded methods of treatment bordering on the empirical. Where such sacrifice has been made, however, an attempt is made in every instance to explain the action and effect of empirical methods on a scientific basis.

MART R. STEFFEN.

Brillion, Wis.
August, 1915.

THE EXCELLENCE OF EVERY ART
MUST CONSIST IN THE COMPLETE
ACCOMPLISHMENT OF ITS PURPOSE

INTRODUCTION

The Action of Drugs

Of all the domestic animals cattle, more particularly dairy cattle, respond most satisfactorily to the action of drugs. A system of specific medication is possible in cattle if it is possible in any animal. Granted that the drug has been intelligently selected for the disease, and that it has been judiciously administered, a definite action is always forthcoming. This is true whether the drug be given orally or hypodermically, but especially so when given orally.

The Administration of Drugs

For all practical purposes the administration of drugs can be limited to oral and hypodermic administration.

Oral administration in the cow is a very simple procedure, especially so when the cow is not confined in a stanchion. The thumb and forefinger of the left hand grasp the nasal septum firmly from above and just inside the nostrils. The head is then raised straight up, under the veterinarian's left arm, and the medicine emptied into the mouth. Most cows will swallow liquids in this manner just as fast as they are poured in. Usually the veterinarian can do this single-handed; now and then a head-strong cow will require that a helper give the veterinarian some assistance in keeping the animal's head raised. There is an impression among farmers that the tongue must be held out of

one corner of the cow's mouth when the animal is being drenched. This is erroneous. The tongue should not be touched by the person giving the drench. The free use of the tongue is necessary to properly perform the act of deglutition. The mouth of the bottle used for drenching should rest against the roof of the cow's mouth, just back of the dental pad, and should then follow the movements of the tongue, up and down. In other words, each time the cow swallows the mouth opens wider and the tongue is drawn back towards the pharynx; the bottle should follow in, keeping it against the roof of the mouth and until the shoulder of the bottle strikes the first molar. When the act of deglutition is completed the tongue comes forward again and the mouth closes; the bottle is then allowed to come forward again towards the region just back of the dental pad. This is repeated at each deglutitory act until the medicine has been entirely poured in. When cattle are drenched in this manner the danger of inhalation pneumonia from portions of the medicament entering the larynx are nil.

To jam the bottle into the corner of the cow's mouth when drenching and hold it there until it is empty is not the correct method and usually induces a fit of coughing immediately after the drench.

The hypodermatic administration of drugs does not differ materially in cows from the same procedure in horses. It is only necessary to use a heavier needle and to select a place in the skin where it can be inserted easily. The top of the shoulder presents a good area for the entrance of the hypodermic needle in cows. The skin is loose enough here so that a fold can be picked up, and it is not so tough here as in other parts. Another point in selecting this region lies in the fact that the veterinarian can get into such

a position here that he can avoid being kicked by the cow when the needle is thrust in.

The needle should be thrust from above downwards, and a slip needle should be used if possible. If a needle with a screw thread is used it is frequently broken if it is thrust in while attached to the syringe. If it is not attached to the syringe, too much time is lost in attaching the syringe after the needle is *in situ*.

When the cow is recumbent the injection can be given in the side of the neck, or in the region of the flank.

Abscess formations following on hypodermatic injections in cattle are almost never seen, even when no antiseptic precautions are taken.

Things that Make for Success in Cattle Practice

In beginning the discussion of diseases of cattle it might be in place to call the reader's attention to the fact that it would be a difficult matter to cite authoritative and, at the same time, practical writings on a system of therapeutics for cattle. Bovine therapy is a specialty of veterinary medicine which offers a considerable field for the development of improved and enlightened methods of treatment. The same is true of the diagnosis of diseases of cattle.

Another point worthy of consideration in cattle practice is the veterinarian's personality, or his demeanor towards the patient. This can almost be summed up in two words: "Be gentle." We are speaking, of course, of dairy cattle. No consideration is given to range cattle in this treatise.

The diseases with which we shall concern ourselves in the following chapters include the pathologic conditions and accidents in cattle with which the prac-

titioner most frequently meets, and especially those conditions upon the proper and efficient handling of which depend the veterinarian's popularity and his financial success in a country practice.

RANULA

There does not seem to be much conformity of opinion among veterinarians as to just what a ranula is. For the present purpose we shall call a ranula a cyst which makes its appearance under the tongue, extending from the frænum linguæ forward, towards the incisors. It is quite generally presumed, that this condition is the result of foreign particles entering into the substance of the submaxillary gland through Wharton's duct.

The symptoms in this condition usually begin with the appearance of fullness or swelling which can be seen best by viewing the cow's head from the side. It begins two or three inches behind the chin in the inter-maxillary space, is pouch-like and extends backward towards the larynx. This swelling is movable and can be pushed upwards between the rami of the lower jaw, free from the skin. (The swelling of actinomycosis affecting this region is adherent.)

After a period of time the cow does not eat normally and saliva constantly drips from the mouth.

Usually it is at about this time that the veterinarian is called. When, after having noted the external swelling, he examines the interior of the mouth he discovers a swelling below the free portion of the tongue. This swelling usually is circumscribed, standing out from the parts to the height of an inch or two and, in the early stages, is quite firm. The fact

that the swelling is circumscribed sharply, differentiates ranula from all other abnormalities in this part of the anatomy, and it can not be mistaken for any other disease.

The treatment is chiefly surgical and consists of lancing the swelling in the mouth at the point proximal to the incisors. A straight abscess knife is merely thrust into the front of the swelling and withdrawn; no extensive incision need be made. If the disease is of recent occurrence the discharge which is emitted following the lance is quite thick and of a dark gray color; in fact, more of the appearance and consistency of necrotic tissue shreds than of pus. If the disease has existed for a considerable length of time the swelling, which is then not so firm, contains a rather thin, syrupy fluid. Nothing further is done to the lesion in the mouth, but the external swelling is to be treated with a mild counter-irritant or an absorbent.

Relief is immediate when the cyst has been lanced and the cow begins to eat normally. The essential feature in the handling of this condition lies in lancing the swelling in the mouth. The external swelling should never be incised. Further, no time should be wasted in waiting for the internal swelling to "point"; it should be lanced even if it is apparently "not ready" to be lanced. Whenever ranula has reached the stage in which it produces trouble in eating it is ready for opening, no matter how firm it may feel. The knife should penetrate to the center with one thrust; upon its withdrawal the contents of the cyst makes its exit.

DENTAL IRREGULARITIES AND OTHER SPORADIC DISEASED CONDITIONS IN THE MOUTH

Dental Irregularities

Irregularities of the teeth do not come to the attention of the veterinarian frequently in a cattle practice. When such irregularities do occur they are usually so evident by their symptoms that the diagnosis is not difficult.

Probably the most common dental irregularity that occurs in the cow is the split and deflected molar; such molars are, in fact more common than is generally supposed. Systematic examination of the mouth and the dental arches will disclose this abnormality quite frequently.

It is, however, astonishing to what length a split and deflected molar can grow in cattle without interfering to any great degree with mastication or the well-being of the animal. We have seen only a very few cases of ulceration of teeth accompanied by bony enlargements and subsequent abscess formation on the maxilla.

Now and then a case is presented in which deciduous molars are capping the permanent teeth, producing a certain degree of difficulty in mastication. This condition is very rare also.

The treatment of dental abnormalities in the cow does not differ materially from the treatment of similar conditions in equine subjects. Split and elongated molars are either extracted or cut down with the molar cutter. Ulcerated fangs are repulsed if they can not be grasped with the extracting forceps.

No manipulations of any extent should ever be attempted in the mouth of the cow without the use of a strong mouth speculum. Those not acquainted with the contractile power of the masseters of the cow should not chance experience to make this acquaintance. The power of the masseters in the cow is tremendous; aided by the scissor-like movements, of which the mandible is capable in this animal, it makes manipulations in the cavity without the use of a good mouth speculum far from a safe procedure. A perfectly trustworthy speculum can be made from an ordinary plow clevis, when no other speculum is at hand. We have used a plow clevis for this purpose a number of times and with satisfaction. Care must be observed to keep it in an upright position, in case the cow moves the head suddenly.

Stomatitis From Mis-Cut Ensilage

Ensilage improperly cut in length is frequently the cause of a considerable degree of stomatitis and ulcerations of the buccal mucosa.

The condition makes itself known by profuse salivation, smacking of the lips, and refusal of feed. All the symptoms point to a purely local trouble in the mouth. Several cattle are usually affected simultaneously. Examination will show the mucous membrane of the mouth quite generally inflamed, with numbers of spots in various stages of ulceration.

We recall an instance during the recent epizootic of foot-and-mouth disease in which a city veterinarian diagnosed this condition, caused by mis-cut ensilage, foot-and-mouth disease. A small-town country practitioner promptly set him right and handled the cases to the satisfaction of all concerned by withdrawing the ensilage from the daily ration.

This, in fact, practically constitutes the entire treatment of this condition. Should a particular case present especially severe lesions a mouth wash can be used for a few days, or the ulcerating spots can be touched up with equal parts tincture iodin and compound tincture of benzoin a few times.

Foreign Bodies in the Tongue

Hard, sharp objects such as pins, nails, pieces of wire and the like, are quite frequently found lodged in the tongue of the cow. We dare say, that in probably ninety-five per cent of the cases absolutely no symptoms are produced that can be observed ordinarily.

When symptoms of an objective nature are produced they point very distinctly to the region involved. Objects which are not wholly embedded in the lingual tissues may be discovered without difficulty. They are to be removed and the wound given whatever attention is required. Very small wounds here are best left alone.

Objects which are wholly embedded are detected by very careful and painstaking examination, disclosing their location always as a distinctly circumscribed area of hardened tissue. When this area has been located it is still necessary to locate the object itself by incision, carrying the incision inward by repeated cuts until the object is disclosed. It is then to be appropriately removed and the wound is treated along ordinary lines.

ACUTE PAROTITIS

Acute inflammation of the parotid glands, commonly termed "mumps," is a very common disease of cattle. It is seen under all conditions of housing and at variable seasons. The prognosis of parotitis in cattle, (not due to actinomycosis), is very favorable and the course of the disease is usually typical.

Parotitis begins with a rigor in most cases. The temperature may run as high as 106° F. in the beginning. At the same time there is noticed a slight fullness in the region of the parotid gland, from the ear to the angle of the jaw. This fullness increases rapidly until at the end of twenty-four hours or thereabout, there is a distinct, rounded swelling in the region. This swelling is very tender on pressure, and the cow stands with the head extended in a line with the neck. If the trouble is unilateral the head is held to one side and partly twisted on its own axis. The cow attempts to eat but finds deglutition very painful, and usually all feed is refused. In drinking water much time is consumed in the act and, after a number of swallows have been taken, the animal gives up the attempt. If the swelling in the parotid region is very extensive and reaches below the larynx and between the rami of the lower jaw there may be a degree of dyspnea.

Ordinary cases yield to treatment in a week or ten days. In other cases abscess formation delays the recovery, so that in certain instances three or four weeks may elapse before the case is completely cured.

The best results in the treatment of this disease are obtained from repeated injections of polyvalent bacterins. We give a full dose hypodermically every three days until the case is under control.

For local applications over the swollen parotids we have found nothing better than iodin tincture. The first two or three days we paint the entire swelling several times during the day with pure tincture of iodin. Later we make the applications only once daily.

Since we have been using the foregoing treatment we have had no case with abscess formation, and recovery is more prompt than with old line treatments. In addition to the above treatment we make it a rule to see to it that a tub or large pail of water is kept constantly before the animal where it can be reached without much effort. A few tablespoonfuls of dilute sulphuric acid are added to each tub of water, for its refrigerant and astringent effect.

The feed should consist of thin slops and other moist feeds.

If abscess formation should occur we recommend early incision. We do not pay much attention to the invasion of the parotid gland with the lance; even when the abscess is lanced directly through the gland substance. Permanent salivary fistula is rare.

ACTINOMYCOSIS ("Lumpy Jaw")

Actinomycosis comes to the veterinarian's attention only when it is localized on some exterior portion of the body. Actinomycotic processes of the internal organs, such as the lungs for instance, are probably never diagnosed ante-mortem.

The actinomycotic lesion most frequently seen in practice is in the region of the angle of the lower jaw or in the parotid region. Next in frequency as regards location is that form which involves the tissues lying in the space between the rami of the lower jaw.

Not quite so frequent, but yet common enough, is actinomycosis of the tongue. In all forms this disease shows a decided preference for young or middle-aged cattle; old cattle are only occasionally affected.

While it is presumed to be infectious it is generally found in isolated instances. One cow in a herd of dairy cattle may have the disease in a well-marked form and not another animal in the herd become affected; but often more than one become affected, the number sometimes including twenty-five per cent of large herds.

When the disease makes its appearance at the angle of the jaw it is in the form of a smooth tumefaction or lump, or "bunch." In the early stages this tumefaction increases in size, becomes more firm, and usually tends to become anchored or fixed to the bone. Still later the center becomes necrotic, and the typical stringy, marrow-colored pus is discharged.

If the case is not checked at this time it may progress until the bone itself is involved in the disease process, and the treatment then becomes difficult.

When actinomycosis involves the tissues lying between the rami of the inferior maxilla we find this space completely filled with a mass of dense, apparently fibrous, tissue. If the disease has existed here for some time the enlargement can be seen plainly with the animal in the standing position; the under side of the jaws between the chin and throat appears curved from before backwards with a considerable belly towards the bottom.

After variable periods of time this swelling breaks down in one or more places. Usually there are three or four openings, and from these escapes actinomycotic pus. The pus in this location is not so characteristic, being thin and lighter in consistency.

Actinomycosis involving the tongue usually does not produce noticeable symptoms until it is quite extensive. When the condition does attract attention it is usually seen that the cow has difficulty in masticating her food. The mouth is constantly held partly open and saliva is continually dripping from the opening. The tongue seems too large for the mouth and when the veterinarian examines it he finds that it feels more or less solid or "woody." When the disease has progressed to this stage it is only a matter of a short time until the cow finds eating an impossibility and if the condition is not properly treated the animal dies of inanition.

The treatment of actinomycosis is very satisfactory when the disease has confined itself to soft tissue. When it has invaded the dense tissues, bone or cartilage, the treatment is not so satisfactory.

In that form which asserts itself in the form of a tumor or bunch at or near the angle of the jaw the treatment begins with incision of the tumor. That this may be safely and thoroughly done it is necessary to cast the patient. It is almost impossible to so confine a cow in the standing position that the necessary steps in the treatment can be satisfactorily and safely performed. Having cast the patient, the veterinarian incises the tumor near the most dependent part, using an abscess knife and making the incision not more than one inch in length. The incision is carried well into the center of the tumor and the interior is then thoroughly curetted. This is a painful operation and is best performed under anesthetics. When this has been done a gauze or cotton wad, which has been saturated in a ten per cent solution of chromium trioxid, is packed firmly into the cavity and the animal is allowed to get up.

In most cases this completes the local treatment in this form of the disease. After a week or ten days the entire mass of diseased tissue drops out and leaves but little scar.

The internal treatment in this, as in all other forms of actinomycosis, consists of the administration of potassium iodid. The result obtained from the use of potassium iodid in this disease is frequently nothing short of marvelous. The dose is from one to two grams three times daily for matured cows, and it is to be persisted in until all symptoms of the disease have disappeared. If iodism supervenes the drug can be discontinued for a few days and then be given again. Unless the disease has already involved the inferior maxilla a complete recovery may be expected in from two to three weeks.

The treatment of that form which attacks the tissue lying between the rami of the inferior maxilla varies from the foregoing only in the local treatment. The openings which are present, if any, are merely enlarged slightly with a sharp curette. If there are no openings present no attempt is made to produce any by surgical means. The swelling is subjected to no further local handling than a daily painting with pure tincture of iodin.

In actinomycosis of the tongue the treatment is confined to the internal administration of the potassium iodid. The results in this form are most prompt and highly pleasing to both the client and the veterinarian. However, unless the treatment is persisted in for a sufficient length of time relapses of this form frequently occur. The treatment should be kept up until iodism has been produced at least three or four times; only then can a cure be assured. Half dram doses of

fluid extract of phytolacca improve the action of potassium iodid when given with it in these cases.

In summing up the treatment of actinomycosis it can be said that even very extensive lesions can be controlled and ultimately entirely cured with judicious use of potassium iodid. In our own practice we do not pay very much attention to the local handling even when the actinomycotic growth has assumed great proportions. The following case report is an example of the effect of potassium iodid in this disease.

A Jersey cow had an actinomycotic tumor at the angle of the jaw extending to and involving the parotid region. It was of long standing when it came into our hands, having gone through various courses of treatment with home remedies. At the time we were called in the cow was barely able to breathe, the tumor having involved the trachea and larynx, probably producing the dyspnea by pressure. The dyspnea was so distressing that a tracheotomy had to be performed. Under treatment improvement progressed so rapidly that the tube was taken out at the end of a week, all signs of dyspnea having disappeared. The tumor itself had been reduced to the size of a lemon.

Another case, illustrating the effect of potassium iodid in actinomycosis involving the tissues in the space between the rami of the lower jaw may be cited.

This case occurred in a Holstein calf, six or eight months old. The entire space was filled up with the growth and a number of openings were discharging typical pus. Examination of the interior of the mouth showed the lingual canal pushed up and nearly filled in, making the tongue appear as though it were crowded against the roof of the mouth. The calf was emaciated and stunted in growth.

The openings were curetted slightly and the calf allowed to get up. He was put on a dram of potassium iodid morning and evening, and the enlargement painted once or twice daily with tincture iodin. In two weeks there was no sign of swelling and the calf had improved remarkably in condition.

To assure a permanent result the potassium iodid was continued a week longer and paintings were made occasionally with iodin. The calf has developed into a fine bull, is now eighteen months old and is entirely free from any sign of the trouble. The entire treatment covered about three or four weeks' time.

It should be mentioned that actinomycosis involving the parotid gland is for some reason more difficult to

cure than when it involves other soft structures, even more stubborn to treat than some of the cases where osseous tissue is extensively involved. The treatment is the same as that for involvement of other organs and tissues.

EPIZOOTIC KERATITIS

This is a disease affecting the eyes of cattle which occurs from time to time in certain localities. It is seen usually during the summer months when the cattle are on grass. Almost without exception it attacks every animal in a herd of cattle which it invades. In rare instances a few animals may escape the infection.

The first attacked in an outbreak usually develop the disease in its most severe form; towards the latter part of the epizootic the cases become milder and may recover spontaneously.

The disease affects cattle only. Horses in the same pastures with the affected cattle do not develop the disease, nor are other animals on the farm affected. We recall an instance where a man, who had a herd of cows under his care during an outbreak of keratitis and who treated the eyes of those affected, contracted a mild conjunctivitis.

In the mild or sub-acute form the symptoms are confined wholly to the eyes. In the severe form the animal shows systemic derangement such as loss of appetite and a considerable interference with the lacteal secretion.

The first symptom, that the farmer sees, when the disease appears in his herd is lachrymation. When the cows are brought in from pasture at night he notices a few cows with "a running from the eyes." The

eyes are only partly open and the lids appear slightly swollen. Within twenty-four to forty-eight hours nearly every animal in the herd is affected. In those that develop the disease in its severe form the lachrymal flow becomes purulent on about the second day. The cornea becomes the seat of an ulcer, or several of them. In not a few cases the ulceration continues until perforation of the cornea results, staphylomata appear and the eye is permanently injured. A deposit of pus may also be seen along the inferior margin of the cornea in the anterior chamber. Permanent corneal and even lenticular opacities frequently destroy the sight.

In the mild cases the symptoms consist of profuse lachrymation, and a considerable degree of photophobia. This disappears in three or four days under treatment, or even without treatment. In the severe form from two to three weeks may elapse before the disease runs its course, leaving one or both eyes partly or wholly blind.

The treatment of this disease is entirely local, consisting of antiseptic and astringent solutions and ointments.

In the mild form we use one per cent yellow oxid of mercury ointment. A small lump of this ointment of about the size of a pea, is placed within the lower eyelid near the external canthus and the lids pressed together a few moments, until the ointment becomes warm. It is then distributed over the interior surface of the orbit by gentle massaging of the lids and the movements of the eye-ball.

The animals should be kept indoors and the stable darkened for a few days. In three to five days recovery is complete. In the severe form, in which the discharges from the eyes are purulent in character a

solution of zinc sulphate of from two to four per cent strength is to be used. It is best applied with a small glass syringe having a soft rubber tip.

With the owner or an attendant holding the cow's head, the person giving the treatment draws the lower eye-lid away from the globe, by pulling on the lashes; about a teaspoonful of the zinc sulphate solution is then squirted into the cup thus formed and the lid allowed to return to position. This is repeated three times daily until the most acute symptoms have disappeared. The treatment is then terminated, with daily applications of the yellow oxid of mercury ointment. In complicated cases that develop ulcers on the cornea the ulcers should be touched up every other day with ten per cent silver nitrate solution, by means of a cotton swab on an applicator. Staphylomata that occur in the form of sacculated protrusions of the iris following perforation of the cornea from ulceration, should be snipped off with scissors and then cauterized. Before either the cauterization of an ulcer or the ablation of the staphyloma is attempted the eye should be anesthetized. The simplest and most convenient method of anesthetizing the eye is by placing a one grain quinin-urea hydrochlorid tablet between the lids, and waiting about twenty minutes for anesthesia to become established.

Collections of pus in the lower part of the anterior chamber of the eye are best ignored. They usually become absorbed without producing particular damage. Opacities of either the cornea or the lens that remain after the inflammation are best treated with iodides internally.

Synechia (adhesions between the iris and cornea anteriorly, or the iris and lens posteriorly) can usually be prevented by the addition of a few drops of fluid

extract of belladonna (or a solution of atropin) to the zinc sulphate solution. This will produce mydriasis sufficiently to withdraw the iris from the active field of the disease.

Darkened quarters are essential in all cases, because of the marked photophobia. The affected cattle should be kept out of bright light until recovery is assured. Light should be excluded from the stable by means of blankets or canvas hung before windows and doors. Bandages should not be used with the object of shielding or protecting the eye. Their use favors ulceration.

CANCER OF THE EYE

This condition, sometimes termed fungus hematoids, is decidedly common in cattle. Only one eye is affected as a rule, and the condition comes to the attention of the veterinarian in various stages, from the benign appearing granular growth on the edge of the cornea to the immense cauliflower-like growth involving the entire orbit.

Most of these cases begin as a small, flat mass of granular tissue near the corneo-scleratic margin. The mass stands off from the globe quite prominently and has the appearance of what is commonly termed "proud flesh." This slowly spreads over the surface of the eye-ball; in most cases, at first, in a thin, flat layer. Later, there is a purulent flow of mucus from the affected eye, and the growth begins to assume the form of a "bunch," layer after layer of new cells being formed. This continues until the growth projects outward an inch or more. The tissue is very vascular; slight handling or touching in any manner induces bleeding. Still later the external surface of the mass

becomes necrotic, assumes a blackish-gray color and constantly exudes serum, pus and shreds of tissue.

If the disease is not checked the growth continues to increase in size, crowding the eye-ball deep into the orbit. Nothing of the eye itself can be seen; the entire orbital cavity is filled with the new growth, the lids and orbital conjunctiva developing additional new growths.

Finally the lymphatics in the region break down, forming enlargements on the side of the head and parotid region that open and discharge purulent matter. The animal becomes cachectic and finally dies.

Treatment of cancer of the eye is not very satisfactory. If the eye is to be saved the case must be submitted to treatment as soon as possible after the first layer of granular tissue forms. If the veterinarian is able to begin the treatment in this stage he can promise his client fairly good results.

To handle the condition satisfactorily, even at this stage, it is usually necessary to cast the cow and produce profound anesthesia, without which all attempts at worthy treatment are usually converted into bunglesome interference. We make this statement with due consideration, following personal experience.

When the cow has been chloroformed the orbital cavity is to be copiously irrigated with a very mild bichlorid or chinosol solution. With an eye speculum holding the lids apart the layer of cells is very carefully shaved off, care being taken not to injure the healthy face of the cornea.

In this early stage it will be seen that the layer of granulation tissue is underlaid with a thin band of white connective tissue. This band is apparently the foundation of the growth; it is very intimately connected to the surface of the cornea. When the soft

layer of granular cells has been thoroughly shaved off, no attempt should be made to remove the band of white tissue just named. We do not disturb this with the knife, but submit it to a thorough cauterization with a solution of bichlorid of mercury, five grains to an ounce of distilled water. This cauterization is performed with a very small, firmly rolled cotton swab; it is dipped into the solution until saturated, after which most of the solution is squeezed out so that the swab is just nicely moist. This is done to prevent any superfluous solution from running over the healthy cornea. The swab so prepared is held and drawn over the entire band of white tissue, using moderate pressure and repeating the process seven or eight times, using a fresh swab each time. When the swabbing has been completed the parts should have a dry, woolly appearance.

The cow is allowed to revive from the chloroform and nothing further done for twenty-four hours, at the end of which time daily applications of a four per cent yellow oxid of mercury ointment are begun, placing a small piece of the ointment between the lids only. After a week these applications are made every other day, until another week has elapsed. They may then be discontinued and the case usually considered cured.

An opaque area will remain in the vicinity of the original lesion.

When the disease has been allowed to progress until there are several thicknesses of granulation tissue and the eye is discharging a muco-purulent fluid the above treatment is of no avail. If it is demanded that something be done the surgeon should advise a complete enucleation of the eye and its adnexa. The sooner this operation is undertaken the better. We do not advise enucleation unless the animal is especially valu-

able for some reason or other. The operation is not always followed by satisfactory results and unless there is an exceptionally good reason for resorting to this measure we recommend slaughter in the severe forms of this disease.

AMAUROSIS

This is nearly always a disease of pregnancy when it occurs in cows. In one instance a case occurred in our practice as a sequel to parturient paresis.

The whole symptom complex of amaurosis is blindness.

There are no lesions in the eye or in its appendages which the examiner can detect; the organs have a perfectly normal appearance.

When the disease occurs during the pregnant state it begins usually during the last weeks of the period. The veterinarian is informed that the cow suddenly went blind. Aside from her inability to see, she is in good health.

Amaurosis occurring under these conditions is a transient disease, which disappears at parturition or very soon thereafter.

The case occurring in our practice as a sequel to parturient paresis persisted for some weeks. Ultimately a course of potassium iodid terminated the case satisfactorily.

It is very doubtful whether any treatment should be attempted in cases occurring in the latter weeks of gestation. Knowing that the condition is entirely the result of the pregnancy and that it will correct itself spontaneously with the arrival of the calf, we can usually serve the patient and our client best by

advising against direct interference with the trouble by medical means. If the condition should persist after the parturition we would advise a course of potassium iodid internally.

EPISTAXSIS

Nasal hemorrhage can occur in cattle as the result of injuries and contusions under the same circumstances that it occurs in other animals.

The particular form of epistaxsis which we will discuss here is that form which occurs now and then in cows during the period of gestation, and not as the result of trauma.

The cows which are the subjects of a hemorrhage of this nature are generally aged cows in somewhat unthrifty condition.

They are most frequently affected during the latter period of pregnancy, usually when about four to six weeks before calving. The symptoms are precipitated by a somewhat profuse flow of blood from one or both nostrils, amounting on occasions to several pints.

The flow stops of its own accord in most cases, after a few hours. The cow is off feed for a day or two and nothing further of note follows. After five or six days, sometimes a week or ten days, the hemorrhage recurs, leaving the cow usually in a dejected, weak condition. Three or four such hemorrhages may occur before the close of gestation, after which they do not occur again. Evidently the pregnant state is responsible for the condition in some manner, it being distinctly a disease of pregnancy.

If the hemorrhages are severe enough and recur at short intervals, the cow is in poor condition to sur-

vive the ordeal of parturition and its probable complications. The milk output is decidedly curtailed and sometimes entirely lacking. If there should happen to be a considerable degree of dystocia, or an infection following on complete or partial retention of the secundines, the cow will probably succumb.

It has been our experience that, where the case comes into our hands at the time of the first hemorrhage or soon thereafter, we can carry the cow through the period of gestation to an uneventful parturition, and prevent recurrence of the hemorrhage.

Our remedy is iron, and we give it in the form of the tincture of ferric chlorid once or twice a day in one ounce doses, diluted with water. No further bleeding occurs and the cow improves in condition promptly.

HEMORRHAGE FOLLOWING DEHORNING

Dehorning is now and then followed by persistent bleeding, the subjects as a rule being unthrifty youngsters. Fatal hemorrhage after dehorning is very rare, but we have seen alarming symptoms, a good many times, result from prolonged dripping in weakly stock.

While it is not a very difficult matter to control the hemorrhage, the means employed should do as little damage as possible. We have frequently seen severe catarrhal involvement of the sinuses and nares from injudicious treatment of a hemorrhage of this kind.

If the patient is quite young and tractable, the best means for checking the bleeding consists of a wad of absorbent cotton and a bandage. The cotton can first be saturated with an ordinary antiseptic solution; it

is then applied on the horn stump and tightly bandaged in place. If the animal is confined in a stanchion, a rope securely tied across the stanchion uprights can serve the purpose of keeping the head raised for an hour or two. The bandage may be left in place for ten or fifteen hours, after which it is cut across and allowed to come off of its own accord.

In other animals, or those which will not submit to bandaging, the best effect is obtained from prolonged irrigation of the bleeding stump with a very warm solution of potassium permanganate not more than one per cent strength. Fifteen minutes of continued irrigation with this agent by means of a fountain syringe gives good results. The syringe should be hung high enough to give considerable force to the stream. In all cases the head should be held high by means of halters and ropes.

A hypodermic injection of atropin sulphate, from one-fourth to one-half grain, assists materially in checking the flow.

We condemn the use of Monsell's solution and Monsell's powder in hemorrhages of this nature. When the solution is used, sinus and nasal catarrh result almost every time; when the powder is used, suppuration always occurs under the scab around the base of the stump.

WIRE CUTS AND OTHER LACERATED INJURIES

Space is devoted in this treatise to the above conditions chiefly with the object of impressing on the practitioner the fact that even the most extensive cuts and tears unite beautifully with proper suturing.

This is especially noteworthy when the cuts or lacerations are in a location where no tendons or articulations are involved in the trauma.

Sutures should be set well back from the edges of the wound and a heavy, braided silk suture material should be used. If care is taken to provide ordinary drainage for the wound, the sutures will not tear or slough out, but remain in place until healing is complete. It is well to select a strong needle for the purpose and a needle holder is almost indispensable because of the extreme toughness of the skin.

A daily irrigation of the wound with an antiseptic solution is all that is necessary as after-treatment. Exuberant granulations do not occur.

Wounds of this nature treated during the warm months must be protected from the activities of flies. For this purpose we find an excellent and cheap preparation in one part oil of cajuput shaken up with two parts of olive oil. This is painted around the edges of the wound with a small brush or feather several times daily. The oil of cajuput alone acts very well as a "fly-chaser," but used alone repeatedly it is slightly irritating and evaporates too quickly. The olive oil overcomes both of these objections.

Another satisfactory fly repellent is composed of phenol one part; turpentine one part, and olive oil or cottonseed oil sixteen parts.

ACUTE ARTHRITIS

Acute arthritis is seen quite frequently in cows. The most common seat is the hock. A causative factor in its localization in the hock joint is an excessively deep gutter, especially of cement construction, in dairy barns.

The symptoms of acute arthritis here are great lameness in the affected leg and swelling of the region of the hock. This swelling is sharply circumscribed, is hot to the touch and very painful on pressure. The affected leg is held up in extreme flexion and usually spasmodic jerky movements are gone through, very much as in the horse.

The temperature is raised considerably and the cow refuses her feed. If the condition is not treated at this time, the acute symptoms gradually disappear. A hard, firm swelling, osseous in consistency, remains in the hock and the muscles on the affected side from the hip down, slowly atrophy. Apparently this form of arthritis in cows takes the form of what was formerly spoken of as arthritis deformans. Pus formation is unknown.

In my experience the best results in treatment have come from blistering. No matter whether the acute or sub-acute stage, a good, sharp blister, repeated as necessary, gives fairly satisfactory results. While the hock usually remains enlarged to some extent, it does not seem to cause any trouble later. Some of these cases recur at intervals. A tonic should always be given in these cases and a box stall provided until lameness disappears. When the blister is applied to the hock, care must be taken to properly protect the udder from the blister. Also when recovery has taken

place, defects in the stable at the place where the cow stands must be improved so as to prevent a recurrence from the same cause.

FRACTURES

While fractures of the bones of the limbs are not as common in cattle as in equine subjects, they do occur occasionally.

On general principles it can be said that fractures of the legs in cattle condemn the animal to death at once. Unless the accident occurs in a very young animal or an animal of great value for breeding purposes, the veterinarian usually serves his client best by recommending the destruction of the animal at once. There is one possible exception to this: simple fracture of the canon bone in an anterior limb. If the animal is in good condition in other respects we occasionally recommend the treatment of these cases. The treatment does not differ from that in other animals similarly affected.

Fractures of the pelvis occur with some frequency in cattle and frequently heal without treatment. They are of importance chiefly as contributing to subsequent maternal dystokia.

Fractures of the ribs are also quite frequent in cattle. Comminuted fractures of ribs in cows usually terminuate in necrosis and extensive sloughing and abscess formation. The abscesses are to be drained and the sequestræ removed. Rarely empyema results.

Fractures of the phalanges are quite amenable to treatment in cattle; however, they always terminate in a permanent lameness and deformity, resembling ringbone formations.

HYGROMA

Practically the only seat of a hygroma in cows is the anterior face of the carpus, resulting probably from bruises contracted in the act of getting up. Again some stanchions and mangers are so arranged that the cows kneel a great deal of the time while feeding and this results in bruising the anterior surface of the knees and the formation of hygromas.

Hygromas in this location have been seen in cattle frequently, some of them of immense size. Even small hygromas in the region named seriously interfere with the movements of the limb and in many cases the cow finds it almost impossible to arise when lying down, or to assume recumbency when standing. A case came to our attention in which the tumor had attained the dimensions of a small cocoanut, making it very difficult for the animal to get up or to lie down. The owner informed us that the cow had to be given assistance in getting up; she would then remain in the standing position for several days at a time.

The treatment of this condition is almost wholly surgical.

With the cow in the recumbent position and the affected limb fully extended, a free incision is made along the antero-inferior surface of the tumor, carrying the incision well into the center. When the knife penetrates to the center of the tumor, a quantity of more or less organized synovia, or even pus, makes its escape.

The cavity in the center of the tumor is then injected with several ounces of pure tincture of iodin, allowing it to remain for a minute or two. It is then flushed out with sterile water until the water returns clear.

A wad of cotton or strip of gauze saturated with equal parts of oleum lini and turpentine is then packed snugly into the cavity, allowing a small portion of the packing to protrude from the wound. This packing is to be renewed every twenty-four hours, and the external surface of the tumor is to be painted daily with tincture of iodin.

At the end of ten days or two weeks the tumor will have decreased to such an extent that interference with the movements of the limb will be abolished. If it is desired that the entire growth disappear, the incision can be renewed and the treatment persisted in for another week or two. The iodin applications externally can be kept up alone somewhat longer.

If, for any reason, it is desired that the size of the hygroma be reduced more quickly, the injection of fibrolysin, as recommended in "Special Veterinary Therapy" (page 12), will accomplish the object very satisfactorily.

As the daily removal and insertion of the packing in the foregoing treatment must usually be left to the owners or the attendants, they should be thoroughly instructed in observing the most regular antiseptic precautions. If this is ignored, grave infections may occur and result in the death of the cow.

INGESTED FOREIGN BODIES

Under this head we will discuss those conditions which occasionally develop in cattle from swallowing hard substances, such as pieces of iron, wire, nails, hairpins, and similar objects.

The habit of ingesting foreign material such as that described above seems to be a normal one in cattle. Nearly all cattle examined postmortem are found to contain in the rumen and other parts of the alimentary tract numbers of such objects. Apparently they rarely do harm; at least they ordinarily give no sign of their presence during the life of the animal.

Under certain conditions, however, the ingestion of hard foreign objects produces results which are quite serious and frequently fatal.

In such cases the offending object is usually of iron, steel or wire in the form of elongated pieces with a pointed extremity. It may be that the sharp end of the object becomes lodged between folds of mucous membrane, or that it enters the mouth of the ducts of some gland. The peristaltic movements and contractions assist in implanting or embedding the object to such a degree that it remains lodged. Necrosis at the point of lodgement occurs and the object penetrates into the peritoneal cavity or into contiguous organs such as the liver, spleen, through the diaphragm and the heart or lungs.

Nails, pieces of baling wire, and similar objects, have been found on postmortem examination in almost all organs, not excepting the heart, and in many instances the animal suffered no ill effects apparent to the eye during its lifetime; although in some cases the object had traversed the length of the abdominal

and thoracic cavities before it became permanently located.

In other cases which have been reported by veterinarians similar objects have sloughed through the abdominal wall and made their appearance and escape from the body, the cow suffering no particular ill effects.

In many cases, however, serious damage is done and grave consequences, or even death, may result from the passage of foreign bodies through, or into, the abdominal cavity and other organs.

Death may be caused in such cases by the direct presence of the object interfering with the proper performance of function in an organ; by inflammatory or necrotic processes developing in the region of the object; and by secondary pathological conditions occurring as the result of damage done by the object.

The diagnosis of abnormal conditions produced by the emigration of foreign bodies is not easy. With very few exceptions, the diagnosis can be made certain only on postmortem examination. If laparotomy were more practical in cattle it might on certain occasions be resorted to in the diagnoses of conditions in which foreign bodies are suspected. Dr. John K. Bosshardt, of Camden, N. Y., has performed a considerable number of successful laparotomies in cattle for intestinal invagination. For him it is from all appearances an ordinary proceeding. The average veterinarian, however, as a rule does not transgress to any great extent on the abdominal viscera in a surgical manner. We rely for diagnostic purposes chiefly on our powers of observation, on our sense of touch, and other ordinary means.

The symptoms produced by foreign bodies which leave the intestinal or alimentary tract vary, of course,

with the extent of the lesions produced, and the organs involved.

The usual history in cases due to the action of foreign bodies is that the cow has been suffering from inappetence for a long time. For weeks she has not been a hearty eater and she looks unthrifty. At times she has had the appearance of a cow suffering dull pains; she stands almost immovable for hours. The expression of the countenance is that described as "haggard" or "anxious"; she frequently grinds her teeth. At other times she has had slightly colicky pains. This covers the general initial symptoms in all cases. Now come special symptoms, varying from now on with the course pursued by the object in its movement within the body.

When the object penetrates and severely injures the peritoneum, the special symptoms are those of peritonitis, with possibly perforation of the abdominal wall and the liberation of the object.

When the liver has been injured seriously by the object the symptoms do not vary from those occurring when the object injures the heart. We find in either instance a set of symptoms which duplicate almost entirely those symptoms seen in infection with Distoma hepaticum. The symptoms due to foreign bodies, however, develop more gradually and persist for a greater length of time. Another point of differentiation lies in the color of the fluid in the dropsical swellings; that found in cases of infection with the liver fluke is clear as water. The fluid contained in the dropsical swellings caused by injuries to the liver and heart from foreign bodies is either yellowish or tinged with blood. Also, in the latter cases, the hide does not peel off as in liver rot.

When a foreign body damages the lung tissue or becomes lodged therein, the symptoms are either those of pulmonary gangrene or of pulmonary tuberculosis; the former when the object is en route through the lung tissue, the latter when it has lodged there permanently.

An exact diagnosis can hardly ever be made with assurance. The diagnosis can be made with reasonable certainty when either the liver or the heart is involved.

The treatment of conditions produced by foreign bodies which have been swallowed and then go through a period of wandering about in the body cavities can only be symptomatic and expectant. If the veterinarian can be reasonably certain that the object is in a portion of the peritoneal cavity where it can be reached and safely removed through laparotomy, he would be justified in undertaking the operation.

In all other locations the symptoms can only be treated as they arise.

THUROW'S DISEASE

Thurow's disease is a condition which is seen now and then in cattle and presents itself in the form of a distention of the subcutaneous tissues with gas. It is always a hyper-acute condition and at times accompanied by most alarming manifestations.

Thurow's disease most frequently affects cows at the height of the milking period, and apparently the nature of the feed has no bearing on the disease. It has been seen in cows on pasture as well as in cows stabled and fed only dry feed.

The symptoms of this disease are always the same and, in our experience, the disease never appears in an atypical form. The history, course and termination are the same in practically every case.

The cow stops eating suddenly, sometimes abruptly, so that the last mouthful of feed is held between the lips. The animal seems terribly distressed almost instantly and stands immovable. Breathing becomes rapid and labored; salivation and lachrymation become marked. Defecation and micturition seem to be performed involuntarily or spontaneously. The animal trembles markedly and soon begins to shift her weight from one leg to the other repeatedly. While the observer is looking on he sees the cow growing in size; the distention is not confined to any particular region but seems to be general. The sides of the neck, shoulders, thorax, flanks, hips, thighs, udder—in fact, the entire integument—seems to undergo inflation.

This distention takes place so rapidly that in the course of a half hour the animal bears but little resemblance to a cow.

If death does not supervene in the course of an hour or two, the swelling begins to recede; in the

course of another hour, every trace of it will have disappeared, and the cow, aside from appearing somewhat "dopey," will be apparently none the worse for the experience. In most cases the attack will have run its course by the time the veterinarian arrives.

Our experience records no deaths from Thurow's disease; two cases which occurred in our practice recently, within a few weeks of each other, recovered within an hour or two. Where we arrive early enough to attend the cow in the attack we refrain from administering any medicinal treament if we observe that the condition is beginning to correct itself.

Should the condition be in the ascendency when we arrive, we administer intestinal antiseptics, such as salol, sulpho-carbolates, or permanganate of potassium. Stimulants, such as aromatic spirits of ammonia, also seem to benefit.

There appear to be no sequelæ to this disease; the cow resumes feeding the same day, and aside from a moderate diminution in the milk output for a day or two, no bad results follow.

TYMPANITES

By the term tympanites in cattle is understood, as a general rule, the distention of the rumen with gas as an acute condition or clinical entity.

Tympanites frequently becomes fully established within a few minutes to an hour after the ingestion of certain feeds, such as clover or alfalfa. When it results from the ingestion of dry feed it develops more slowly and usually does not assume such serious proportions.

Tympanites resulting from the ingestion of green food may progress so rapidly as to cause death from suffocation within ten to twenty minutes.

The symptoms of tympanites are always the same and leave no room for doubt in diagnosis.

When the veterinarian arrives he usually finds the cow gasping for breath, the mouth wide open, and the tongue protruding. The left flank is immensely distended and the cow constantly shifts her weight from one hind leg to the other. Some cases are accompanied by vomition. Apparently the sensation endured by the cow is more one of distress than of acute pain. Only occasionally does a cow show signs of acute pain with tympanites.

The treatment of tympanites is both surgical and medicinal.

The surgical end of the treatment consists of tapping the rumen with a large trocar and canula, thereby permitting the escape of the gas. The rule in our practice calling for tapping is the opening of the mouth.

Although the cow may be immensely bloated, we do not resort to the trocar unless the cow is so dis-

tressed that she opens her mouth in the attempt to breathe. As long as she keeps her mouth closed, breathing through the nose, we find that we are able to give relief by medicinal means alone.

In those cases in which the cow breathes only sparingly, with mouth agape and tongue protruding, no time should be lost in performing the tapping operation. A large cattle trocar should always be used, forcing it into the distended rumen slightly below the middle of the most prominent point in the triangle formed by the last rib, lumbar vertebræ and external angle of the ilium, causing the instrument to take the direction of "inward, downward, and slightly forward."

Ordinarily no time is wasted in cleaning up the seat of operation.

The veterinarian's trocar should be in a surgically clean condition always, so that he may not be required to choose between two alternatives: one, that of endangering the life of the cow by postponing the operation until he can sterilize his trocar; the other, that of jeopardizing the ultimate smooth result of the operation by taking a chance on infection resulting from tapping the animal with a dirty trocar.

In passing or entering the trocar the veterinarian should assume such a position that he may avoid being kicked by the cow. Many cows will make a fairly good attempt at reaching the doctor with a hind foot when the trocar is forced in, although they are to all appearances near collapse from suffocation. This point is one of the reasons that we say the cow evidently does not suffer greatly from pain in this condition. Were the animal's distressed condition the result of extreme pain, the entrance of the trocar would probably not be noticed.

When the instrument has been entered the trocar is pulled out of the canula at once, allowing gas and food particles to spurt out. It is well to stand to one side when this is done, because frequently fluids are forced out far enough to soil the surgeon's clothes. When portions of ingesta block the lumen of the canula, the trocar is passed in and out a few times to dislodge them.

If proper medicinal treatment is at hand so that it can be at once administered, the canula may be withdrawn as soon as the distention has gone down. If it is not convenient to administer correct medicinal treatment at once, the canula should be left in place until all danger of a renewal of the gas distention is past, if necessary for several hours. During this time some one should remain in attendance for the purpose of keeping the canula free from blocking with food.

When the canula is to be removed, the trocar should first be passed into it, removing the trocar and canula together with one or two quick jerks. The point of entrance should be given a thorough application of tincture of iodin.

Administration of medicaments through the canula for the abatement of the fermentive process in the rumen we have found wholly unsatisfactory. In the medicinal treatment of this condition we have obtained the best, most prompt, and most satisfactorily uniform results from four ounces each of aromatic spirits of ammonia and oil of turpentine, administered in a pint or two of water in the form of a drench. Credit for this treatment belongs to Dr. J. M. Wright, formerly of Chicago but now retired. Even severely grave attacks of tympanites yield almost instantly to one such dose. In a period of practice covering more

than ten years we can not recall more than two or three cases requiring the second dose.

Potassium permanganate takes second place in the medical treatment of tympanites. One dram dissolved in a quart of water and given as a drench will terminate ordinary cases favorably in a few minutes.

Complete abstinence from all food for at least twelve hours should be the rule after an attack of tympanites of moderate severity, and for twenty-four hours after an attack requiring tapping.

Abscess formation is an occasional sequel to tapping for tympanites. Proper drainage by surgical incision effects prompt recovery if treatment is commenced promptly.

SURFEIT IN FAMILY COWS

One of the pathological phenomena which attacks the family cow is a condition which merits some space in any treatise on cattle diseases, although it is a very benign and transient trouble if properly handled. This condition is over-feeding.

Most veterinarians have a few clients in town who keep a cow; also, most veterinarians have no love for the family cow. Some of the most obscure, atypical diseased conditions can be seen in the family cow, and, as a patient, the family-town-cow is in a class by herself.

Surfeit is of frequent occurrence in these patients, and presents such variable clinical aspects that the symptoms are difficult to tabulate. In our practice we have formed the habit of diagnosing as surfeit all irregular or atypical conditions in town cows and treating them as such; at least, until something definite

can be made out. And in most instances we are not deceived.

A list of the variable quantities and varieties of feeds which are thrown to the family cow would be a very long one. We have known of family cows that received regularly the meat scraps from the table and apparently relished them; this, of course, in addition to the usual grain and hay ration.

Only a few days ago we had under our care a family cow that is now sixteen years old and has never been given a drink of clear water; bran slops are as near a drink of water as she ever gets. Nearly every veterinarian knows of equally odd instances. It is chiefly for this reason that we say the veterinarian, in most cases, will not be greatly in error when he attributes most of the obscure, irregular attacks of indisposition in the family cow to errors in feeding: first, excessive feeding, and second, injudicious foods.

Complete abstinence from all feed for from twelve to twenty-four hours, with a moderate dose of saline physic, or a few doses of intestinal antiseptics, are usually sufficient to straighten the case out.

In regard to the matter of complete abstinence from all feed, the veterinarian must be firm and emphatic. Many family cows are the idol of the family they supply with milk, and often it is no easy task to carry out the starvation treatment.

PERSISTENT ANOREXIA

This seems perhaps an odd name. Anorexia or lack of appetite usually is only one of the symptoms of a disease. In the condition I am about to speak of, anorexia is the whole disease and the whole symptomatology.

These are aggravating cases for the veterinarian. To the owner the case appears very simple; the cow "just won't eat anything." Nothing else of an abnormal nature can be seen. Cases have been reported in which the inappetence or anorexia persisted for two weeks without any evidence of other disease or a sign upon which to base a diagnosis.

In my own experience I have never been able to make a definite diagnosis in these cases, and other experienced practitioners with whom I have discussed this subject make the same confession. The cow simply (and merely, and only, and every other which way) won't eat. That is all. Examine her as carefully and as thoroughly as you can and you disclose absolutely nothing else which will help you in diagnosis. For this reason I know of no better name for the condition than that of "persistent anorexia."

Because the loss of appetite is the only symptom, the owner usually does not call the veterinarian in until the case has been running along two or three days. In any other disease than a case of persistent anorexia the cow would have developed more or less positive signs pointing to the nature of the trouble in such a period of time. In persistent anorexia, however, nothing has developed. The owner tells you she has not eaten for so and so long and she won't eat now. When you get through with your examination,

you know no more; first, last, and all the time, "she simply won't eat."

The prognosis must be very guarded. The cow may begin to eat again very shortly after you have prescribed for her, and then again she may not come back to feeding for a week or more.

In my practice I have tried many different remedies for this condition. Until we discover the cause or the nature of this ailment, our treatment will be more or less empirical, and to my knowledge the pathology in persistent anorexia has never been explained. My best results have come from agents acid in reaction; lately, I use dilute acetic acid, giving two ounces morning and evening for two or three days, with an equal amount of water.

PICA

This name has been given to a diseased condition affecting cattle that is characterized chiefly by a depraved appetite.

It is doubtful whether pica is in itself a disease. It is highly probable that it is only a symptom of certain pathological changes which are the result of disturbance in certain metabolic processes.

The habit of ingesting indigestible objects can almost be said to be normal in cattle. Therefore, it would appear that an exaggeration of this habit could be easily induced under conditions which would have a tendency to disturb the anabolic equilibrium; such conditions, for instance, as might be induced by an unbalanced ration.

Pica is a condition which affects the family cow most frequently; it is only rarely seen in herd animals.

There are practically no other symptoms beside the depraved appetite.

The cow seems to have a craving for roughness, such as pieces of leather, rags, crockery, mortar, pieces of wood, metal, dirt, and so forth. She picks these objects up and apparently has a relish for them, frequently ignoring good feed for the sake of chewing up and swallowing an old shoe. She does this not only occasionally and casually, as all cows do normally, but ravenously and persistently and continually. In very aggravated cases the animal's coat lacks gloss, and constipation may be present. If not properly treated, some cases of pica persist indefinitely, the cow gets poor in condition and may develop a variety of conditions. In other instances, pica is a very transient condition, which disappears in a few days after it begins to attract attention.

The treatment of this affection begins with an investigation of the ration fed. The condition can usually be promptly terminated with the inauguration of measures assuring a properly balanced ration.

In other instances, free access to an unlimited supply of salt is all that is necessary.

In cases which occur under good feeding conditions and in which salt treatment fails to correct the trouble, the cow is given a saline purgative. When the purgative has acted, two or three drams of resublimed iodin is given in a capsule. Nothing further is required as a rule. After a prolonged siege of pica it is always a good plan to examine the cow's mouth for injuries, lacerations or ulcerations, and varying degrees of stomatitis. The prehension, mastication and deglutition of the various objects which the cow chooses to select not infrequently produce injuries in the mouth which later prevent the eating of regular feeds.

IMPACTION OF THE RUMEN IN COWS

In this article we will consider (1) some of the more prominent or diagnostic symptoms, and (2) the medical treatment of impaction of the rumen.

We will ignore the surgical treatment in this treatise.

Unless the young graduate has served his apprenticeship in a locality where this condition occurs frequently, and unless his preceptor has given him the opportunity to become familiar with its symptoms and handling, he will find it a more or less troublesome condition in more ways than one. In diagnosis it offers difficulties because the symptoms are by no means true to type in every case. They vary according to the completeness or severity of the stasis.

In treatment this condition presents difficulties also. Usually the beginner resorts to measures which are too heroic; he attempts to do too much. Instead of aiming to give just the correct degree of assistance, he usually overdoes his part.

In beginning the consideration of the more important symptoms I would mention the "grunt." Whenever impaction of the rumen is severe enough to attract attention, the cow grunts. I can not find a better word for this than grunt, although in the very grave cases this grunt becomes almost a moan. The grunt is synchronous with the respirations and is not quite constant in the milder cases. I mean by this that it appears intermittently; you hear it once or twice and then a few respiratory acts are gone through without the accompanying grunt. In the grave cases the grunt comes with every breath and is loud enough to be heard quite a distance. I repeat, if the case before

you is one of rumen impaction, you will hear this grunt, either intermittently or regularly.

A second symptom which, if present with the grunt, clinches the diagnosis is the deviation to the left of the spinal column. Possibly it would be better to say the apparent deviation to the left. Standing squarely behind the cow, it appears to the eye as though the spinal column forms a curve to the left and upwards in the lumbar region. This is so marked that the farmer sometimes calls attention to it before you notice it, saying, "She stands humped up to one side." The more complete and extensive the impaction, the more marked is this symptom. You may be called to cases in which the grunt is heard from other causes, and you may be called to cases which show this lateral deviation of the spine from other causes. But, whenever you get a case of impaction of the rumen, you will hear this "grunt"; and whenever you hear this grunt and also see this deviation of the spinal column to the left and upwards in the same cow, *you can stake your professional reputation on the diagnosis of impaction of the rumen.*

The absence or the presence of peristaltic sounds are not diagnostic. Even in some quite grave cases of impaction, you will hear some such sounds if you have a good ear and apply it over the rumen for a sufficient length of time. The cardinal symptoms are the grunt and the curve in the spine. When you have made these out, you can satisfy your desire for further confirmation of the correctness of your diagnosis by noting the tension of the mass in the rumen, the evidence of ileus, absence of eructations and regurgitations, and so on. If the case is mild, the temperature is not far from normal; in a well marked case it usually stands around 104 degrees Fahrenheit. Good

appetite or the other extreme, anorexia, are of no value in diagnosis here. Some cows in this condition will eat well until the case assumes a really grave character. Defecation, while usually scant, is not always entirely absent.

Now for the treatment. The first thing, and always the first thing, is to strictly forbid feeding. Not a sprig or a grain must be allowed until rumination is again fully established. This may mean a day or two, or it may mean four or five days without food of any kind. Water may be given freely. In these cases I see to it that before I leave the place every bit of feed has been taken out of the manger and matters so arranged that the patient cannot reach food thrown to cows standing near her. For us, this complete abstinence from food constitutes seventy-five per cent of the treatment. The balance consists of plenty of water and repeated small doses of fluid extract of nux vomica with either salol or sulpho-carbolates compound. I prefer salol. The nux is given in half-dram doses every three hours; the salol is given with it in dram doses. This is kept up until peristalsis is growing marked and there are occasional eructations and signs of rumination. In a well marked case it may take three or four days to get this far. Then I give a large dose of oil, such as castor, linseed or cottonseed, containing an ounce or two of a volatile, carminative oil, such as cajuput.

The usual "salts" have no place in the treatment of this impaction. When the bowel movements are again fully established and rumination is resumed, small quantities of feed may be permitted, gradually returning to the accustomed ration.

I can recommend the foregoing treatment as the *safest* treatment for this impaction; it is slow but

sure. There are forms of treatment aimed at quicker results, but they are not always safe. Even in veterinary practice the motto is "Safety First."

COLIC

For various reasons colics do not occur so frequently in cows as in horses. Colic in the cow is probably always a true colic. In horses, "colic" covers a multitude of pathological conditions, at least, in the common sense of the term.

The symptoms of colic in the cow are quite acute and sometimes they may assume even a violent character. The condition usually begins with the animal striking at the abdomen with the hind legs and with kicking and stamping with the hind legs. If in the stanchion, the cow moves backward and forward, crowds to one side and then to the other, and occasionally throws herself down, groaning when down. At times a slight bloat is present, but usually none.

If no flatulence is present, a hypodermic injection of morphin, from four to six grains, with a quarter or a half grain of atropin, will end the trouble promptly. If there are some signs of flatulence, a drench of some internal antiseptic solution is given in conjunction with the morphin and atropin.

OBSCURE ABDOMINAL AILMENTS

There occur in cattle a number of indefinite, obscure disease conditions which affect the alimentary tract and which invariably defy diagnosis of an exact character. In many of these cases the most sincere, thorough and skilled practitioner is unable to make a diagnosis which he could uphold by the symptoms and clinical findings.

The general clinical picture points to some derangement of the alimentary tract; yet, there are not sufficiently clear signs to warrant a reasonably specific diagnosis.

Cases of this kind are at times the cause of considerable embarrassment to the young practitioner. If he will remember that old and experienced practitioners are as much "at sea" with these cases as he, it may make the battle a bit more pleasant for him.

The cases under discussion appear somewhat in the following form:

The cow has been "off feed" for a few days; she has not quit eating entirely, but she "don't eat like she ought to.". She has a somewhat "glum" expression of the face, and once in a while she grinds her teeth, hardly often enough to attract attention, however.

She is neither "full" nor bloated, nor is she drawn; occasionally, if she is observed for a long time, she seems to tense the abdominal muscles just a trifle. The evacuations are good enough to be termed normal. The temperature is also normal. Auscultation brings out nothing of an abnormal character in either body cavity. In some cases there is just a trace of tenderness shown by pressure on the lower abdominal

wall. These are all the symptoms that can be dug out of the case; and even these are not always very plain at first.

Our treatment for these cases begins with a good mustard plaster over the entire abdominal wall.

The balance of the treatment consists of a few doses of some intestinal cleanser such as triple sulpho-carbolates or salol, in conjunction with ounce doses of fluid extract of cascara sagrada. Three or four doses two hours apart are usually sufficient.

Absolutely no feed of any kind is allowed while the treatment is being given. Water is permitted freely. When the course of treatment has been fully administered, feeding may be resumed. This should be done gradually, however, giving not more than half a feed the first few times.

Most of these cases occur during the winter months when the cattle are housed. Only in one or two instances have we seen this condition during the summer time.

INFECTION WITH DISTOMA HEPATICUM

Infection with Distoma or Fasciola hepaticum produces a disease commonly termed "liver rot." It is seen only in cattle that have had access to lowlands, river bottoms, sloughs and marshes, and then chiefly in the South.

The disease runs a very slow course and usually is not recognized until it has reached what is known as the third stage, when its manifestations are quite evident.

Almost the first symptom to attract attention is an edematous swelling below and between the inferior

maxilla. This swelling runs from the chin to the throat and may hang downward three or four inches. It has the feeling of being full of water, is loose and squashy, and can be compressed and moved about in all directions. If it is incised the contents are found to be a thin fluid, colorless and clear as crystal, with a sweetish acid odor. This odor is very faint, but is easily detected if some of the fluid is permitted to dry and evaporate in the hand.

At this time the cow refuses to eat heartily, and constipation is present. Within two to four days, sometimes a week, the dropsical swelling extends down the front of the trachea and an immense swelling locates itself between the forelegs. This slowly moves backward along the under side of the abdomen, and later the hind extremities are also swollen. Ascites usually develops and a severe form of dysentery is now raging. There is a severe dyspnea and the cow maintains the standing position for days. If death does not occur at this point the dropsical swellings slowly decrease in size, the cow begins to eat a little, the dysentery is checked and recovery comes at the end of three weeks or so. As the dropsical swellings leave, the skin over them assumes a dry, tanned appearance and peels off in rolls, somewhat of the nature of the shedding of skin which follows some cases of purpura hemorrhagica in horses.

The cow emerges from an attack of this condition greatly emaciated and rarely regains her former condition of health and strength.

When proper treatment is instituted early in the attack, however, the course of the disease can be considerably shortened and the cow returned to reasonably good condition.

If the veterinarian is called in when the dropsical swelling is confined to the region of the jaw and has had enough experience with the disease so that he recognizes the condition, he can give reasonable assurance that the cow will survive in good condition at the end of two or three weeks.

In localities in which this disease occurs quite regularly a dropsical swelling under the jaw should always excite suspicion of this disease. If there is inappetence and constipation at the same time with a slight elevation of temperature, we incise the swelling. If the contents are clear and watery and have the characteristic sweet-acid odor, it is safe to diagnose infection with Fasciola hepaticum.

In occasional cases it may be possible to determine distinct tenderness in the right flank and right anterior quadrant of the abdomen. Another early symptom is frequent shifting or changing of the front limbs: the cow flexes one knee and then the other, off and on.

The treatment which we have used with very good results in this disease is somewhat troublesome, but this should not deter one from adopting it, especially if the cow affected is a valuable animal.

We begin with incision of the dropsical swellings, making the openings where the fluid will drain out freely and where the wound will not do other damage. The incisions should be quite extensive, so as to assure constant leakage from them. One or two incisions properly located in the swellings will exude several gallons of fluid in the course of twenty-four hours.

The medicinal treatment consists of Fowler's solution of arsenic and iodid of potassium given at the same time. We give an ounce of Fowler's solution

in the morning; an hour later we give two drams of potassium iodid in aqueous solution. At noon another ounce of Fowler's solution and an hour later another two-dram dose of the iodid. The same is done at night. This performance is kept up for a week or ten days; the swellings are usually disappearing by this time and the general aspect of the case is favorable in appearance. For a few days from now on the Fowler's solution and potassium iodid are given only at noon, and the morning and evening medication now consists of tonics; nux vomica, gentian; iron and quinin with strychnin; or other tonics with which the attending veterinarian is familiar. When four or five days have passed in this manner the Fowler's solution and potassium iodid are discontinued altogether, and the tonics alone are kept up for a few days more.

The cow should be stabled for such time until she is again in good condition, when she may be turned on grass. Most cases occur in spring; good grazing after an attack aids materially in building the cow up.

ENZOOTIC DYSENTERY

This is an infectious form of dysentery which affects cattle in the northern half of the United States, being most common in the north central states.

The disease makes its appearance in the winter months and in early spring. It seldom covers large areas; usually only a township or two is invaded.

Animals of all ages are attacked; sex, condition, and breed exert no influence on the disease. It affects sucking calves and aged cows, as well. A characteristic trait of this disease is the fact that in nearly

every instance it attacks every cow, calf and bull on the premises; only in rare instances do any members of the herd escape the infection. To the veterinarian who has had no experience with this disease this peculiarity usually leads him to assume that the cause of the outbreak can be attributed to food contamination. That he is mistaken in this assumption he discovers later when he finds the disease on other farms, sometimes miles away, where entirely different feeds and water, and entirely different methods of feeding and watering are used.

In many instances it is no difficult matter to trace the infection carrier, from one farm to another, in the person of visitors, stock-buyers or others.

In other respects, also, the disease has the earmarks of an infectious disease; the symptoms are always the same, the color of the feces is always the same, and the course of the attack varies but slightly in any instance. Another point indicating an infectious character in this disease is the fact that towards the latter part of an outbreak the cases are milder; this is characteristic of many epidemic and epizootic diseases.

Enzootic dysentery is serious because it runs a rather slow course, during which the secretion of milk is almost entirely stopped. We recall an instance in which a herd of fifteen cows altogether gave less than an ordinary milk pail full of milk at one milking. Deaths occur but rarely; in two outbreaks we remember but a single death in each, although hundreds of cows were affected.

The symptoms of enzootic dysentery can not be mistaken easily for those of other forms of dysentery. The attack begins on a farm, usually, with one or two cases. A cow refuses her feed and it is seen that she

is suffering from a form of scours. Even on the same day another cow or two quit eating and begin to scour; the next day a few more, and so on, until the entire herd is affected. We know of no instance in which the animals were all attacked on one day; a herd of twenty head may consume a week's time in contracting the disease. The feces have a characteristic appearance and color. They are not watery, but have a mushy or granular appearance; the color is a rich chocolate shade, sometimes (just barely) more towards a red shade. There is no abnormal odor.

In most cases the cows refuse to eat while the diarrhea persists, which may be from three days to a week or ten days; they drink water freely, even to excess, if permitted to do so.

The temperature is raised from one to three degrees.

After two or three days from the beginning of the attack the animals develop a cough. In some of the later cases the cough may be present from the start; mucous rales can then be heard in the trachea and lungs. Also, about at this time, there appear spasms of certain muscle groups; these spasms are tonic in character and most frequently affect the posterior limbs.

The milk flow is almost entirely absent; the animals lose flesh rapidly. A herd of dairy cows just emerging from an attack of enzootic dysentery is a sorry spectacle to behold.

The animals recover irregularly in a given herd, by ones and twos, but not generally in the same order in which they were attacked; frequently the cows first affected are the last to recover. In a large herd a month may elapse before the entire herd is free from the disease.

As far as our observations go, one attack confers immunity; the disease has not appeared on the same farm twice in our experience.

A poorly nourished cow, should she happen to be attacked by this disease in a severe form, may not survive. Otherwise recovery is the rule. The disease is therefore important chiefly because of the resulting shrinkage in the milk output.

The treatment of enzootic dysentery should begin as soon after the disease is recognized as possible, and every bovine on the farm should be treated from the first. Almost invariably all cows are affected, once the disease enters a herd, and the veterinarian who has had experience with this disease knows that although he may not be able to check the outbreak abruptly, he can lessen the severity of the attack by early treatment. Cows treated before they develop symptoms of the disease are affected in a very mild form, and recover in a few days. If the animals are treated only as they develop the disease, one after another, the attack in a herd is prolonged unnecessarily.

We have had the best results in the treatment of this disease from an oily preparation consisting of beechwood creosote, twenty drops; oil of cajuput, half an ounce; cottonseed oil, two ounces; this size dose is given four times daily until the diarrhea stops. If the case is an exceptionally severe one we may give one or two doses of opium to control the scours at first; this is rarely necessary with the above treatment.

We pay little attention to the feed; in most cases the animals will not eat anything. Water should be given in very small quantities, but at frequent intervals. If the cattle are watered at a tank they usually drink to excess.

In our early experiences with this disease we used various medicinal agents which can be relied on in other forms of diarrhea. None of them accomplished much good. In the combination given above we consider the beechwood creosote the active principle. The value of the combination might be enhanced by the addition of tincture of capsicum.

COCCIDIAL DYSENTERY

Coccidial dysentery in cattle is an acute disease occurring in epizootic and enzootic form.

It is seen most frequently during those months of the year in which cattle are grazing, and young cattle are most commonly affected. Mild cases of the disease terminate favorably in three or four days. Severe attacks terminate in death frequently in the same number of days. Several animals are affected at the same time. On occasions an entire herd was attacked on the same day. The diarrhea becomes suddenly and fully established in almost all cases. The evacuations are copious and thin and are soon accompanied by very serious tenesmus. Within the course of eight or ten hours bloody streaks, and sometimes large blood clots, can be found in the evacuations. In grave cases the tenesmus may attain such severity that varying degrees of eversion of the rectum are seen in some of the cows. There is great depression and loss of appetite and the animals are soon in a very weakened state, trembling and staggering about. Before death there may be coma, or delirium bordering on convulsions. The feces invariably are foul smelling and are usually intermixed with gas bubbles.

If the attack is a mild one improvement is evident

at the end of eighteen or twenty-four hours; if the symptoms do not decrease in severity at this time the attack is usually fatal.

The treatment of coccidial dysentery does not prove successful in very severe attacks, which run on to a fatal termination in spite of all treatment. In mild or only moderately severe attacks the results from treatment attained are quite satisfactory.

The first important step is to have the animals stabled at once and provide for watering them from a supply different from the one they had access to while on pasture. The water should be allowed in very small quantities, but frequently.

The medical treatment begins with an ounce dose of dilute acetic acid in a small quantity of water. Every half hour thereafter until relief is evident we give tincture of opium two drams, oil of eucalyptus half an ounce, dilute acetic acid half an ounce, shaking these three drugs up together with a little water for a drench. As soon as the evacuations are less frequent and the tenesmus less severe two or more hours are allowed to pass between doses. Cases exhibiting protrusions of the rectal mucosa as a result of severe tenesmus may be given a large dose of morphin sulphate hypodermically. Animals recovering from an attack of coccidial dysentery have a long convalescent period. They do not resume normal feeding nor gain their former condition for a long time after recovery.

JOHNES DISEASE

This disease, also known as para-tuberculosis intestinalis, is a form of diarrhea which affects cattle with some frequency in certain localities. The disease is an infectious one and the feces from cattle suffering from it are to be considered as the most common carrier of the infection. The course of Johnes disease is chronic in character, extending over several months as a rule, and generally terminating in death.

While the disease occurs mainly in isolated instances, affecting only one or two cows in the herd at the same time, the infection may remain in the stable indefinitely, so that cases of the disease appear at intervals for years.

The symptoms of Johnes disease are not accompanied by any very remarkable diagnostic climax. Until the veterinarian has seen a few cases of the disease he does not get a very clear conception of the clinical index to the condition.

A cow, in the beginning, has somewhat more frequent bowel evacuations than normal; a little later these evacuations become somewhat thin in consistency, and finally, at the end of a week or two, a real diarrhea has developed. This diarrhea is very persistent; it may improve slightly on certain days, but always returns. There is no particular character of evacuations; towards the end of the disease there may be some mucus mixed with the feces.

The appetite of the cow is but slightly affected, but emaciation rapidly becomes evident. At the end of six weeks or two months there is a veritable cachexia, terminating in marasmus, decubitus, and death. Recoveries are rare once the disease becomes well estab-

lished. In some cases constipation sets in before death occurs, so that there may be several days with no evacuations, preceding the end.

The treatment of Johnes disease up to the present time has been unsuccessful. Until a satisfactory treatment has been elaborated the handling of this disease lies solely in prevention. Feces from infected animals should be cremated and premises disinfected. Immediate isolation of the patient should be the rule, and when death comes the entire carcass should be buried in quicklime.

DIFFERENTIAL DIAGNOSTIC MARKS OF—

Enzootic Dysentery

1. Affects cattle of all ages; calves, young stock, old stock.
2. Occurs during winter and spring.
3. Affects animals stabled or on range.
4. Onset is sudden.
5. Course of disease is from one to two weeks.
6. No appetite.
7. Feces have no abnormal odor.
8. Feces are granular.
9. Feces are chocolate colored.
10. Milk secretion totally absent.
11. Pertussis is a common complication.
12. Practically never fatal.

Coccidial Dysentery

1. Affects chiefly young stock.
2. Occurs during grass season.
3. Affects animals being pastured almost wholly.

4. Onset is very acute.
5. Course of disease is from two to five days.
6. No appetite.
7. Feces have distinct odor; foul.
8. Feces are liquid.
9. Feces are hemorrhagic.
10. Milk secretion diminished.
11. No pertussis.
12. Commonly fatal; probably 20 per cent.

Johnes Disease

1. Affects all ages.
2. Occurs in all seasons.
3. Affects animals under all conditions of feeding.
4. Onset is gradual.
5. Course of disease is from one to three months.
6. Appetite remains good.
7. Feces have no marked odor.
8. Feces are copious and thin.
9. Feces have no characteristic color.
10. Milk secretion not greatly affected.
11. No pertussis.
12. Always fatal, eventually.

SIMPLE DIARRHEA IN CALVES

Diarrhea in a simple or sporadic form occurs in calves during the first few weeks of life. It may appear as early as two or three days after birth; most commonly at the end of the first week or ten days.

The bowel evacuations are performed at short intervals, the feces having a very light yellow color and considerable odor. When the disease has been active for twenty-four or forty-eight hours the calf has a dejected appearance, is listless, and does not move about much. In some cases there are slight colicky pains.

If the disease is not checked the calf rapidly loses strength, lies down almost constantly and dies, having lingered for several days in an exhausted cachectic condition.

The treatment of this condition is followed by prompt and satisfactory results if the case is taken in hand while the patient is yet vigorous. Neglected cases frequently die in spite of the most careful nursing and judicious treatment.

Calves which have just been attacked with diarrhea are given a few large doses of intestinal antiseptics. We have had most excellent results from the triple sulpho-carbolates: zinc, sodium and calcium. Calves up to two weeks old we give two thirty-grain tablets at one dose, and repeat the same in about four hours. This is usually all that is required.

When a case has been neglected until the calf has abdominal pains and has become listless and weak, the treatment requires more care. The calf must be provided with warm quarters, and if the abdomen is

quite tense and the colicky pains frequently recur, a weak mustard plaster is applied on the belly.

We then order a dose every hour or two of tincture of capsicum ten minims, triple sulpho-carbolates fifteen grains (5 grs. each of sulpho-carbolates: zinc, sodium and calcium), and compound tincture of gambir half ounce. This is kept up hourly until four or five doses are given, thereafter every two to four hours according to the case. If more stimulation is necessary a small dose of warm brandy may be given now and then.

In *exceptional* cases tincture of opium may be used to advantage but it should not be used if it can be avoided. Frequently, when opium is used in conjunction to check the scours the case is transformed into a stubborn attack of constipation which proves as difficult to relieve as the disease which preceded it. In the treatment which we have outlined are contained no agents to cause the prolonged effect of opiates.

When a troublesome constipation does supervene on a case of diarrhea in calves we recommend large doses of castor oil, with a few doses of cascara sagrada. If the treatment which we have outlined is used the occurrence of constipation as a sequel will be practically unheard of.

INFECTIOUS DYSENTERY OF CALVES

This form of diarrhea in calves is very prevalent in some localities. It differs from sporadic or simple dysentery to that extent that it is very rapidly fatal. It can probably be best described as a hyperacute diarrhea.

This disease attacks calves very soon after their birth; in some cases it is present at the time of birth. Usually the symptoms set in on the first or second day and the course of the disease is very rapid and the termination fatal in a high percentage of cases.

Infectious dysentery of calves begins as an ordinary diarrhea, developing in the course of a few hours into a very grave condition.

The evacuations are at first normal in color; later they become of a pale-grey, or almost white, shade. The odor is intense, and the evacuations are accompanied by much straining. In spite of the severe tenesmus, the evacuations, which are very thin now, do not spurt outward, but merely run down the buttocks. This region and the tail are soon very filthy and foul-smelling. At the end of from ten to fifteen hours, convulsions, and, finally, decubitus and death, occur.

The treatment of this disease has not been very satisfactory in the past. Most cases terminated in death in spite of prompt remedial measures.

Recently fair results have been reported from serums prepared from horses subjected to the effects of the colon bacillus, and this serum deserves further trial at the hands of practitioners. However, for all purposes in general practice, we must yet consider the handling of this disease almost wholly from a

prophylactic standpoint. Pregnant cows should not be permitted to give birth in infected stables and all calves born on premises where the disease has been known to occur should at once be submitted for preventive inoculation. For all purposes of prevention the serums now in use appear to be reliable.

We are not acquainted with any form of curative treatment which we can recommend.

MUSCULAR RHEUMATISM

This is by no means a rare affection in dairy cows. It is seen quite frequently in cows housed in cemented stables, not so frequently in cows stabled on ground or wood floors, and almost never during the months when the cattle are on grass.

Most attacks are of a sub-acute character. Both young and old cows are affected, and in rare instances even calves have been seen thus afflicted. An attack of muscular rheumatism appears in cattle in a gradual manner. Usually a single animal is affected, but it is nothing unusual for several cows to develop symptoms at the same time.

There is at first a general stiffness, shown by very limited flexion of the extremities, especially the hind extremities, and a disinclination to move about. If the animal is confined in a stanchion she has some difficulty in getting up after she has been lying down for a time; there is no struggling or flopping about as in cases due to weakness or paresis, but the attempt to arise partakes more of the nature of hesitancy. The animal seems afraid to undergo the exertion required to assume the standing position. When the standing position is finally acquired the cow "stands in a bunch," swaying backward and forward

a few times, and then shifts from one leg to the other for several minutes. When she is released from the stanchion she does not seem to appreciate her freedom and may not follow the herd out into the yard. If she is urged she moves cautiously, becoming somewhat more supple in her movements after she walks a short distance.

The foregoing is about the extent of the symptoms in usual cases. In more marked attacks there appears excessive lameness in one limb or another after this. Soreness cannot be located in any particular spot; the animal exhibits signs of pain equally on any part of the member when examined or gives no reaction whatever to manipulations. There is some falling off in appetite and but one or two degress of fever.

The response to treatment is very prompt. If possible the animal should be turned loose in a box-stall, the floor of which should be dry and well bedded. A saline purge is administered. Following this the cow is to be drenched three times daily with a preparation containing fluid extract colchicum half a dram, sodium salicylate one dram and hexamethylenamine one dram in each dose, using water to dissolve the last two ingredients. A few doses produce considerable improvement, and four or five days of this treatment effects the disappearance of all the symptoms.

In severe cases in which there is a very marked lameness in one leg a liniment may be applied in conjunction with the above treatment. A good combination for use as a liniment in these cases is oil of cajuput one ounce, camphorated soap liniment two ounces, alcohol two ounces, water to make twelve ounces. This should be briskly rubbed over the muscular and tendinous regions of the affected limb several times during the day.

PARAPLEGIA (Bovine Azoturia)

Under this head we will consider that form of paralysis of the posterior limbs which occurs in cattle with considerable frequency, and always precipitately.

It is this condition that has been designated "azoturia of cattle." In our estimation the condition does not resemble azoturia in any other respect than the inability to arise; the other symptoms and phenomena of azoturia are not present. Neither is paraplegia ever seen in cattle in a mild or partial form, as is the case quite often in horses attacked with azoturia. Paraplegia always occurs in the cow in the form of a complete paralysis of the posterior extremities, total loss of power and absolute decubitus.

It affects cattle of all ages, in every state or condition, in pregnancy and in barenness. It affects cattle housed under the most sanitary and hygienic conditions, as well as cattle kept in filthy environment. It occurs in the winter months when cattle are stabled and in the summer months when they are at pasture. There are no premonitory symptoms indicating the approach of the trouble. In every other form of paralysis, with which we are familiar, there are certain unfailing premonitory manifestations. Not so in this disease. The cow is found in the recumbent position, usually flat on its side. The veterinarian is called in; he can get no other history in regard to the case. All the owner can tell him is that he found the cow down, either in the yard, barn, pasture, or wherever it happened to be. He has observed absolutely no sign of ailing or sickness before the animal was found down. Usually the farmer thinks the cow has been, what he calls, "split."

The veterinarian begins his examination, and finds a case about as follows:

The temperature is either normal or not far from it. If the cow has been down only an hour or two, the temperature may be at 104 degrees Fahrenheit or thereabouts. After she has been down a number of hours the temperature is about normal. When the animal is rolled up on her chest (providing she has not already assumed that attitude voluntarily) she appears entirely normal. She is bright and apparently suffering no pain; if there is some feed within reach she begins to eat.

The pulse is somewhat faster than normal, but not much altered.

When the cow is urged to get up she willingly makes the attempt; she is able to stand on her front legs but the hind ones lie inert and the rump does not leave the ground. If the animal is given assistance by lifting at the tail she makes a few feeble outward strokes with each hind leg and then usually falls in a heap. There seems to be a total lack of power for *ad*duction and flexion; all motion is towards *ab*duction and extension, as in an obturator paralysis. Sensation is diminished in the parts from the lumbar region backward, and in some instances almost absent. In nearly every case the tail is flabby and immobile. The latter is diagnostic of this condition and differentiates the case from obturator paralysis, obstetrical paralysis and other diseases of similar symptomatology. The course of paraplegia is irregular and indefinite. Usually the cow retains a good appetite and apparently suffers no pains. At intervals she makes strenuous efforts to arise, creeping or falling over a considerable area in the course of a day.

At first there is coprostasis; after a day or two defecation is re-established. Improvement may be seen sometimes within a few days; the tail regains its motility, the hind legs come nearer to the body. After a few more days the standing position is attained for a moment or two, but the cow almost immediately collapses again. Several more days, rarely before two whole weeks after the onset of the attack, see the cow get up and stand fairly steady. Complete recovery, with good co-ordination, requires another week or ten days.

In other instances the cow shows not a particle of improvement, and may remain in the recumbent position until she is either killed or dies from other causes. This may not occur for three or four weeks.

The treatment of this condition is not highly satisfactory. In our practice we treat the cow for two or three days and if she shows no improvement at the end of that time we advise destruction. If she shows improvement sufficient to arouse reasonable hope of recovery, we continue the treatment a few days longer, or, if the cow continues to improve, until recovery is complete.

The best results in the first few days of the sickness come from atropin in half-grain doses, every four hours. On the second or third day we begin with strychnin, a quarter grain of the sulphate four times daily. Massage of the affected parts sometimes hastens recovery. Counter-irritants applied along the spinal column in the lumbar region are also used.

The treatment is mostly empirical, because the pathology of the condition is not known. It is therefore doubtful whether any improvement obtained is the result of the treatment or of *vis medicatrix naturae.*

ACUTE BULBAR PARALYSIS

Under this head we undertake to discuss a pathological condition in cattle which occurs quite frequently and usually in a typical form.

The exact nature of this condition from an etiological standpoint is not known. In some instances it assumes an enzootic character, having been described by some authors in this form as an enzootic pharyngeal paralysis. As the symptoms are not by any means confined to the pharynx, nor to the effects of a pharyngeal paralysis, this name is misleading.

A disease which is prevalent in Europe in an enzootic and epizootic form and which has been named the disease of Aujesky, somewhat resembles what we term acute bulbar paralysis in this country. Aujesky's disease may be the same disease in a more active form; the cases which he has described as occurring in Europe have to be differentiated from furious rabies. Acute bulbar paralysis as seen in the United States may on occasions be taken for dumb rabies. Under certain conditions, such as exist when the disease occurs shortly before or after parturition, it is also confused with parturient paresis.

Acute bulbar paralysis seems to affect cattle of all ages, although there is a slight preference on the part of the disease for animals which are not aged. As a general rule it may be said to be sporadic in nature; in exceptional instances it is mildly enzootic.

The inaugural symptom is a dullness, or an appearance indicating general indisposition. The animal will neither eat nor drink; rumination is suspended and constipation exists. These symptoms the veterinarian usually hears in the history given by the owner. The

veterinarian as a rule does not see the case until more definite symptoms have developed, which is usually on the second or third day. The cow now lies down most of the time. If she is sufficiently urged by prodding or whipping she can usually be made to get up on her feet. This is a good point to have in mind in case the attack has occurred soon after calving, when it would be necessary to exclude parturient paresis.

When the cow has assumed the standing position she constantly shifts her weight from limb to limb; she is restless and in a few minutes lies down again. While she is standing she sometimes kicks backward repeatedly with one hind leg.

There are no bowel evacuations, but usually the urine dribbles away, apparently involuntarily.

There is a steady dripping of clear saliva from the mouth; not a ropy, stringy saliva hanging from the mouth but a steady dripping, and clear. Tears flow down over the sides of the face steadily. When the cow has been lying down for a few minutes she apparently goes to sleep if she is not molested; she begins to moan and will remain in a semi-comatose condition indefinitely if undisturbed. If she is slapped or shaken she wakes, looks about a moment or two, and goes to sleep again. During the moments of wakefulness the mouth hangs partly open.

In this stage the temperature is raised from two to four degrees. In the end it becomes subnormal. Swallowing, if not entirely impossible, is performed with great reluctance and difficulty.

At the end of another twenty-four to forty-eight hours the cow is no longer able to gain the standing position; she lies flat on her side part of the time, making ineffectual struggles to arise at intervals. There are now symptoms pointing towards pulmonary

edema or congestion; severe dyspnea accompanied by rustling sounds. The tongue protrudes from the mouth; diarrhea is present. The temperature now keeps going down until it may be several degrees subnormal; the periods of coma are prolonged, and the cow dies on the fifth or sixth day after the beginning of the attack.

Some cases run a somewhat slower course, dying on the eighth to tenth day. Now and then a case survives the acute attack, gradually assuming a subacute form and lingering along for several weeks. In the latter form inspiration pneumonia develops at last and pulmonary gangrene supervenes.

The treatment of this disease is far from satisfactory. In fact, all that we can do is to treat the symptoms as they arise. Until the exact nature of the condition is discovered the treatment will be empirical.

We can point to no particular remedial agent or method of treatment which has given good results in our practice. We have used every form of treatment which the symptoms, and pathology so far as it is understood, would indicate as helpful, but without success. For this reason we refrain from suggesting any method of handling this disease, leaving the treatment to the judgment of the individual veterinarian.

Because of the apparent semi-infectious nature that the disease sometimes assumes, when it occurs in the enzootic form, we would suggest as a precautionary matter the thorough disinfection of the premises on which a case develops. If it can conveniently be arranged the patient should be taken out of the herd and isolated. It is impossible to differentiate the sporadic from the enzootic form clinically; because of this all cases of this disease should be regarded as being communicable.

SENILE PARALYSIS

This is a condition which occurs with considerable regularity in old cows. In most cases it takes what may be termed a progressive form, starting with a stiffness in one hind leg. After weeks, sometimes months, a lameness develops in one hind leg, without any evidence of swelling or any localized area of soreness. About at this time it is noticed that the cow "can not get up as well as she used to"; she seems to be weak in the posterior parts. Also about at this time she begins to look bad; does not thrive or keep in her usual good condition, although her appetite is apparently as good as ever.

Very soon after the trouble has reached this stage the cow becomes entirely unable to get up without assistance. This condition is confined to aged cows and is never seen in cows under nine or ten years old.

Usually it is best in these cases to advise the destruction of the cow. While now and then one of these cases improves sufficiently under treatment to enable the owner to dispose of the cow in some other manner, it is usually a loss from a financial standpoint to attempt their cure.

The condition is seen both in cows which are in various stages of pregnancy and in cows which are barren. It seems, however, to run a more rapid course in pregnant cows.

PUERPERAL MANIA

This is a somewhat rare pathological condition, but occurs frequently enough in cows so that a knowledge of its manifestations is essential.

Puerperal mania is important in the main because of the possibility of its clinical phenomena being mistaken for rabies. In itself, in so far as prognosis is concerned, puerperal mania is a benign and very transient disease.

It is seen in cows nearly always during the last months of pregnancy, or during the first week after calving. An otherwise kind and docile cow becomes suddenly nervous and highly excitable. Within a few hours she becomes violent, well nigh unmanageable. If she is not confined she races about the yard or pasture wildly, bellowing and pawing up the earth. Feces and urine are passed in small quantities every few minutes and there are clonic spasms, or "ripplings," of various groups of muscles. The animal will assume a wild, menacing attitude; she makes plunges at her own shadows, and will pursue dogs or other animals that intrude on her domain. She is less intent on rushing at human beings; she may threaten to attack but is easily driven off. Her apparent viciousness is confined to rushing at objects and other animals; she does not lay hold of anything with her teeth. When she rests, the conjunctiva is seen to be injected, the eyes are very wide open and prominent; on the whole, the beast has a "crazy" appearance.

The treatment is confined to placing the animal in a spacious yard or other enclosure where she can not easily come to injury while plunging about. The prognosis has to do chiefly with the duration of the

attack; this is so variable that attempts at forecasting it can be only problematical. All signs of the disease may disappear in a few hours; on the other hand, the attack may last several days or even until the termination of the pregnancy.

With the symptoms of puerperal mania in mind, the veterinarian can not easily confuse the condition with rabies. While at first sight the cow with an attack of puerperal mania may cause some concern through the fear of rabies, a calm consideration of the situation will usually decide the diagnosis. We would make a comparison of the two diseases from the standpoint of diagnosis in the following manner:

Rabies	Puerperal Mania
Possible history of attack by dog or other animal.	No history of such occurrence.
Premonitory symptoms, such as itching, indisposition, etc.	No premonitory signs.
Dysphagia.	Swallows normally.
Attacks viciously, using teeth on objects poked at her.	Attacks excitedly only; will not grasp objects with teeth.
Is not easily prevented from pursuing her attacks.	Is easily driven off.
Tends towards paralysis and prostration rapidly.	Is unchanged, or soon improved.
Death is practically a foregone conclusion.	Always recover.
Affects both sexes.	Affects pregnant females only, or those in the puerperium.

If, even then, it should be difficult to make a satisfactory differentiation the animal should be isolated for twenty-four hours. A case of rabies will have developed unmistakable symptoms at the end of that period; whereas, a case of puerperal mania is usually well on the road to recovery in that time.

While recoveries have been reported in cases of rabies it is very doubtful whether they were correctly diagnosed. We can readily understand how one having had no experience with puerperal mania could mistake the condition for rabies. For us, however, the very fact that the animal survives is ample evidence that the disease with which the animal was afflicted was *not* rabies.

OBSTETRICAL PARALYSIS

This is a condition which follows only those cases of parturition in which the calf is exceedingly large, or cases of dystocia, during the correction of which the cow is subjected to prolonged handling and bruising. It is rarely, if ever, seen after normal delivery or after cases of minor dystocia.

The ideal circumstances for the development of this condition consist in prolonged labor due to an abnormally large fetus. The usual history is that the cow was down during the birth and has not been able to get up since, or that she went down very soon after the calf was delivered and is unable to arise.

These cases can not very easily be confused with parturient paresis because the entire symptomatology in obstetrical paralysis is confined to the inability of the cow to get up. In every other way the animal is normal; no sign of coma or indisposition in the least. The animal eats and drinks and looks well in every way. The most careful examination will bring out nothing of value in diagnosis, except that usually the tumefied condition of the vulva gives evidence of the difficult labor.

The history in these cases determines the diagnosis. A very large calf; much pulling; long time in effecting delivery. Sometimes these cases supervene on cases of dystocia which the veterinarian himself has been called to relieve and it is on this point that I want to call especial attention in this chapter.

It has been my experience that obstetrical paralysis will not develop in these cases where the cow, if lying when delivery is effected, is immediately made to rise. Every mans must be used to get the animal upon her feet at once and when this has been done some one should remain present to see to it that she remains up for at least two hours, during which time a little walk should be given every twenty minutes.

If the cow is on her feet when the calf is delivered every effort should be made to keep her up for at least two hours, walking her a short distance every ten or twenty minutes during this time.

I can sincerely recommend this as a certain preventive of this condition, a condition which is very unsatisfactory to treat. Once obstetrical paralysis is fully developed, a guarded prognosis must always be given.

Some of these cases lie around in this condition for three or four weeks and then die. Others lie around just as long and recover. Sometimes the condition terminates in complete recovery within three or four days, and I have known them to terminate fatally also, in an equally short period. Recovery is the rule, but the duration of the period of recumbency is so varied and so indefinite that statements on the part of the veterinarian forecasting the termination must be given guardedly.

Probably the best and most prompt effect in treating cases which have been allowed to develop this con-

dition (I say allowed to develop it because it can certainly be prevented) is obtained by frequent vaginal douching with hot water containing just a trace of fluid extract of belladonna. This in conjunction with strychnin or nux vomica administered internally is rational and quite satisfactory.

PARTURIENT SYNCOPE

This term, parturient syncope, I would give to a condition occurring with considerable regularity in cows after calving and for which there has heretofore been no generally recognized name.

It is most commonly seen in cows which have given birth to three or four calves, rarely in younger cows, and hardly ever in heifers. It follows both normal and difficult parturition and is apparently not governed by any degree of dystocia or absence thereof. The usual history in these cases is that the cow has been off her feed since she had her calf, a day or two before. In some cases the condition does not become marked until four or five days or even a week after calving. The veterinarian finds the symptoms as follows:

The patient appears fairly bright; usually the abdomen is just a trifle "drawn." The temperature, if not normal, is raised but half a degree or so. This is all, if the doctor has been called in the early stages of the condition, and aside from the fact that the cow refuses to eat, nothing more is brought out in the examination. Of course, as a consequence of the anorexia, milk secretion is almost absent. If the owner has not called the veterinarian in the early stages, the latter sees a greater variety of symptoms

when he is called to a case of this kind later; he finds now what could have been avoided by prompt and appropriate treatment. Dropsical swellings of varying proportions are now present, located first along the front of the trachea and later gravitating down between the forelegs. Constipation and later a diarrhea appears, and the cow now has a haggard, "anxious" countenance. She appears somewhat stiff and does not care to move about much. The temperature is normal or very close to normal.

The treatment in the early stages of this disease is simple and promptly satisfactory. It begins with a prolonged flushing of the genital tract with very warm antiseptic solution. Every veterinarian has his own favorite antiseptic for such purposes and any one which is non-irritating will do. One such douche, if thoroughly carried out, is all that is necessary in the early stages of this condition. To complete the handling of the case, we usually leave a few doses of nux vomica.

When the cow has been allowed to develop the more severe form of this condition, either through the owner's procrastination or the veterinarian's treatment, we have on our hands a very grave case, and one very unsatisfactory to treat.

The heart muscle has suffered from the effects of the toxin which has been elaborated and slowly absorbed. We are assuming that we have to deal in this condition with a slow, saprophitic infection. We are led to this assumption chiefly because of the peculiar progress of the symptoms—namely: the dropsical swellings in the absence of pyrexia and the almost rheumatic stiffness.

We begin the treatment in this form as in the milder stages, with very warm antiseptic douches.

Although the os is usually firmly closed in this stage, the irrigations of the vaginal canal seem to do much good. These douches are to be given several times daily by the owner or attendant. Medical treatment internally consists of spartein sulphate, from twenty to thirty grains three or four times daily for a week, or usually until the dropsical swellings leave. Warm quarters and good nursing help much, and in some cases a dose of mixed bacterins seems to do good. The mortality is very high where the ailment is allowed to progress to this stage.

PARTURIENT PARESIS

This disease, commonly termed milk fever, is of very frequent occurrence in dairy cows.

Not so many years ago milk fever was considered a very serious disease; it was usually fatal. Today this disease causes but few deaths. Although the present day treatment of this disease is wholly empirical, it is *the one* disease that the veterinarian can almost invariably handle with success. This is the more astounding when we take into consideration the rapidity with which the disease attacks and the hyperacute character of its manifestations once it becomes established. In but few other pathological conditions do we see such a profound symptomatology occur so precipitately. In a way, the prompt and regular recovery removes the stain of empirics from this treatment to a certain degree. There can be not a shadow of doubt but what the present day treatment of parturient paresis is correct. Even though we understood the pathology of the disease fully, it is not probable that we could make any improvement in the treat-

ment; at least no improvement that would improve the ultimate effect.

Parturient paresis, when it occurs in its typical form, is diagnosed ordinarily from the history and circumstances appertaining. Typically the disease makes its appearance from one to a few days after parturition; atypically it appears after the lapse of a greater number of days, sometime even weeks or months, after parturition, and in a few instances before the close of the period of gestation. When the symptoms of parturient paresis occur before parturition, or remotely after it, the term *parturient* paresis can not be used consistently; we would suggest that in this form the disease be given the name of *pre-parturient* paresis. Whether the pre-parturient form of this disease is the same as the parturient form, pathologically, is a question. It is an established clinical fact, however, that the pre-parturient form responds to the same treatment as the parturient.

To take up in detail the circumstances, periods, variations, and clinical phenomena of this disease when it occurs in an atypical form would make a small volume in itself. In the diagnosis of this disease in an atypical form the veterinarian has to rely chiefly on his powers of intuition. In this sense we can find no better word than *intuition;* that form of *diagnostic* intuition which comes to the practitioner only after close contact with a number of cases of a given kind in actual practice. To positively diagnose most of the cases of atypical paresis of this form merely from the symptoms and clinical manifestations is an impossibility. What is usually termed a *snap diagnosis* is what is called for here; the form of diagnosis which old and experienced practitioners become adepts in. A rapid and collective mental assimilation of the evi-

dent clinical picture, history, circumstances and presumptions; all of which is instantaneously and almost subconsciously tabulated, with previous experience as a guide, and the diagnosis is made.

Parturient paresis in typical form presents no difficulties in diagnosis. It follows an easy parturition with the greatest frequency. This is one of the points to be elicited in the history obtained from the owner or attendant—namely: whether the parturition has been complicated by any degree of dystocia. The disease is rarely, almost never, seen after difficult parturition.

The cows affected are almost without exception in good condition and heavy milkers. While young cows are more frequently affected, the disease also attacks aged cows. From twenty-four to seventy-two hours after the birth of the calf is usually the time of attack in the typical form.

The cow refuses her feed and shows a stiffness or stiltiness in her movements of the hind legs. Within not more than a few hours there are rigors or trembling of the posterior muscle groups and the cow is losing the co-ordination of movements in the rear extremities; she goes "wabbly" behind, and while standing still constantly shifts her weight from leg to leg. From this stage it is only a matter of minutes, or at most an hour, until the animal goes down. Very soon after assuming the recumbent attitude there appear signs of drowsiness, and within another hour or two the cow is in a comatose condition. She frequently snores; the neck is sharply bent on itself with the head resting against the thorax and the animal is not aroused by blows or chastisement. In well marked cases this attitude is maintained in death, which may occur in a few hours if the animal is not properly

treated; in other cases death is preceded by convulsions, terminating in opisthotonic position. In most of the cases to which the veterinarian is called the animal is down.

The early signs of the disease frequently are not observed by the attendant or owner; in other instances the disease progresses so rapidly that even if the onset of the disease is observed and recognized the cow goes down before the doctor arrives. He finds the patient in the position which we have just described. There is salivation of varying degree; the reflexes are abolished almost without exception. In most cases the temperature is decidedly subnormal taken per rectum, running as low as 96 degrees Fahrenheit in some cases. The history which accompanies—namely: calf born a day or two before without trouble, etc.—decides the diagnosis.

By far the greater number of cases of parturient paresis constitute in themselves the sole complication of the parturition. We mean by this that this disease is only very rarely accompanied by other diseases or accidents of pregnancy, such as retention of the after-birth, eversion of the uterus, and other troubles. Now and then a case occurs in company with such conditions, but in rare instances only.

The prognosis in parturient paresis is favorable as long as there is a spark of life in the cow. We have seen quick recoveries in cases which had every appearance of being moribund. In parturient paresis the veterinarian arrives "too late" only if he arrives when the cow is dead. While it is highly desirable and advantageous that the case be taken in hand as soon as possible after the onset of the attack, hopes for saving the animal's life and usefulness in cases in which treatment has been delayed, should never be

given up as long as the cow shows signs of life. In this disease the old saying "as long as there is life there is hope" is most fitting.

We urge haste in beginning the treatment of any attack of parturient paresis; all cases should be treated at once, because of the rapidity with which death approaches at times. But at the same time we desire to caution against a grave or unfavorable prognosis in cases in which treatment has not been given promptly.

We wish to emphasize this point because we have known veterinarians to refuse to treat cases of this disease when treatment had been delayed and the animal appeared to be in a dying condition.

The treatment of parturient paresis has been a success since the introduction, by Schmidt, of the potassium iodid treatment. Schmidt's treatment has gradually been converted into the present day air treatment, having taken various steps, from iodid of potash solution to saline solution, to sterile water, to oxygen, and lastly to atmospheric air pressure. As far as it has been possible to ascertain, the effects which are obtained are due to pressure exerted on the parts within the udder with which the various agents come in contact. But even this is not fully understood; as we said in beginning the discussion of this disease, the treatment is empirical. It has been held that the effect of the treatment was due to the oxygen content of the various agents. This is not in accord with practical evidence, because not much difference is seen in the result whether atmospheric air or pure oxygen gas is injected.

Today, in this country at least, the treatment of parturient paresis is commonly called the "air treatment," and consists in the main of tensely inflating the

udder with air. Various methods are in vogue for this purpose and one is probably as good as another. Most of the apparatus used for this purpose consists of a rubber bulb, rubber tubing, and a milk tube.

No matter in what stage of the attack the veterinarian gets the case the treatment is the same. While the veterinarian is preparing an antiseptic solution and assembling his air machine the owner or attendant should milk the udder out thoroughly. Usually there is not much milk present in the udder, but what is there should be milked out thoroughly. The cow is now to be shoved into such a position that the four teats can be handled easily; usually it is sufficient to pull the upper hind leg straight backward.

The two teats on the under side are to be inflated first. The entire teat is washed with antiseptic solution, paying special attention to the teat orifice, and the milk tube attached to the air apparatus is then inserted. Air is pumped in until the quarter supplying the teat is tensely distended. The tube is then carefully removed and the same process repeated with each of the remaining teats.

If the end of the teat is repeatedly pushed into itself until the distention of the teat proper has decreased to a certain extent no more air will escape. To accomplish this satisfactorily requires some practice but when it is once mastered it proves a good "stunt." We most emphatically *condemn* the application of tapes or rubber bands to the teat with the object of preventing the escape of the air. If they are applied sufficiently tight to accomplish the purpose for which they are used they frequently cause trouble. In an experience in practice over a period of more than ten years we have never had an unfavorable sequel directly due to the inflation of the udder, such for in-

stance as mastitis or teat strictures; and we confess that in many instances we have not taken the antiseptic precautions demanded. We attribute our "luck" to the aversion we have towards tapes and rubber bands for holding the air in the udder. Some of our friends in practice who were using tapes or rubber bands had cases of stricture and mastitis as sequelæ at times.

When all four quarters have been properly inflated it has been the custom to give from a quarter to a grain of strychnin sulphate hypodermically. For some time we have been using atropin sulphate, in doses from a quarter to a half grain, in place of the strychnin. The result has been a quicker response to the treatment and a more prompt *complete* recovery.

When we have given the atropin injection we see to it that the cow is thickly covered with blankets, the object being to hasten the rise of the body temperature to normal, toward which desirable end the atropin injection plays no small part.

In our experience we have found that when the temperature rises to normal the animal is able to get on her feet. In atypical cases the temperature is no guide to the animal's condition. In typical cases *the temperature is a very reliable guide,* so much so with us that, when the temperature approaches normal we consider the fight won. After giving the atropin and applying several layers of blankets we take the temperature every fifteen minutes. In most cases it begins to rise promptly and usually reaches normal before three hours elapse. As the temperature rises the coma lessens, the cow becomes brighter and indulges in frequent acts of normally performed deglutition.

We do not wait for the cow to arise voluntarily; as soon as she is fairly bright, with a normal or near-

normal temperature, we urge her at intervals. As soon as she makes a good attempt to arise she is assisted by lifting by the tail. When she gains the standing position she is supported until she becomes steady and stands firmly; until she is standing quite firmly she must not be permitted to move about for fear that she may fall. When she does stand firmly she is left to herself; water may be allowed but no feed for from eight to twelve hours; at the end of that time she may be milked. This concludes the handling of this disease in its usual typical form.

We will now consider some of the variations, those especially which are of the most frequent occurrence.

Relapse

In some cases of parturient paresis, which in the start are apparently typical cases, the cow gives only a very moderate response to the treatment. She begins to brighten up some but after an hour or two no further progress has been made. In such cases the best method is to "leave well enough alone" for a few hours. If at the end of four or five hours no further improvement has set in the entire course of treatment is to be repeated. In other cases the cow responds to the treatment promptly, gets up on her feet within a few hours and is apparently entirely relieved. After about eight or ten hours she suddenly develops another attack, goes down, and soon falls into a comatose state. In cases of this sort the entire treatment is to be repeated, just as though it were an initial attack. The response to treatment in relapses of this disease is not so prompt as in primary attacks.

Pre-parturient Attacks

The treatment of cases occurring before parturition is exactly the same as that for cases after parturition.

Eclamptic Symptoms

In occasional cases of parturient paresis the cow may show symptoms of eclampsia. There is not a very well marked degree of coma; but instead more or less nervousness, with muscular twitchings. In this form there is a true dysphagia, usually accompanied by spasmodic contractions in the region of the larynx. In typical parturient paresis a certain degree of dysphagia is also present, probably due to the general coma or lifelessness. In the cases presenting eclamptic signs the dysphagia is a true one, apparently due to neurotic hyper-tension. These cases are to be given the air treatment as in typical cases. By no means administer strychnin in this form of the disease. We have seen grave symptoms of strychnin poisoning from a half-grain hypodermic dose in such cases. The atropin injection is ideal for these, and is usually followed by prompt cessation of the nervousness.

It has been our experience that the cases showing symptoms of eclampsia make the quickest recoveries; it is only necessary to *omit* the administration of strychnin. Otherwise the treatment is the same as for the typical cases.

Complications

When parturient paresis occurs in company with such conditions as a retained placenta or an everted uterus no attempt should be made to correct these abnormalities until the treatment for parturient pa-

resis has been administered. The inflation of the udder and the hypodermatic injection of atropin sulphate consumes only a few minutes time, after which the correction of the other abnormalities can be undertaken with safety.

Prevention

For the prevention of the occurrence of parturient paresis in dairy cows we can offer no remedy. In different localities different theories exist in this regard, most of them being particular ideas about feeding before calving, or certain notions about milking the cow before calving. Others consist of laxative treatment ante-partum. We have seen the disease occur in spite of all precautions and supposedly preventive measures, and have no great faith in any one or the other. If we had *any* choice in this regard we would side with the theory which recommends the administration of a cathartic just before calving.

A PATHOGNOMONIC SYMPTOM OF FETAL DEATH

It is a common occurrence for the practitioner to be called in attendance on cows heavy in calf and presenting symptoms of a somewhat doubtful character. These cases, in cows nearly due to calve, are always important from the standpoint of their effect on the reputation of the attending surgeon. An error in diagnosis and wrong treatment in these cases usually results disastrously for the doctor, even if not for the cow.

A variety of pathological conditions within the uterus present very complex symptoms and it requires considerable experience to recognize and classify them correctly. There is, however, one symptom in this class of cases which is almost absolutely reliable and can always be depended upon. This is the rapid, sometimes chorea-like twitching of the vulva in those cases in which the fetus is dead and undergoing degenerative changes. This twitching of the vulva is also seen in other diseases, but, in cows nearing the end of the period of gestation it is a sure diagnostic sign of fetal death when accompanied by fever, anorexia and other usual symptoms.

For many years I have not hesitated to base my diagnosis of fetal death on this sign and I have never yet been deceived by it. Remember I say this sign is reliable when the fetus is dead and undergoing degenerative changes.

I have not been able to test its reliability in other animals than cows, in fact, am not sure whether it is a symptom in other animals. However, in the cow I have so much confidence in this sign that I never hesi-

tate to begin preparations for delivering the calf at once when this symptom is present, and in every case I find a putrid fetus. This sign is doubly valuable as an aid to diagnosis of these cases because, usually, a putrid fetus is retained; only rarely is a putrid fetus expelled spontaneously at the end of the period of gestation. All practitioners recognize the gravity of this condition.

It must, of course, be understood that this diagnostic sign is in reference to those cases in which the fetus dies and begins to degenerate while the os is still closed. It would be of no value and has no bearing on cases of fetal death resulting at the close of the gestation period from dystocia.

RABIES

Rabies is not a common disease of dairy cattle. When it does occur the diagnosis is made with little difficulty ordinarily; because a good history of the manner of infection, almost without exception a dog bite, can usually be obtained.

The period of incubation in this disease is quite variable, depending upon the amount of virus that has been deposited, the virulency of the virus, the resistance of the patient, and the location of the wound. The period of incubation is shortest, other things being equal, when the bite is inflicted on the head; animals bitten on the extremities take a longer time to develop the symptoms of the disease. Probably in no case, however, does the period of incubation exceed three months; belief is no longer held in excessively long periods of incubation in this disease. Now that the infective organism has been recognized we may expect positive data on this point in the near future.

The diagnosis of rabies clinically can be made with reasonable certainty by many experienced practitioners. A positive diagnosis is possible only by laboratory methods. In cattle rabies occurs almost wholly in the furious form; cases of paralytic rabies have been reported in cattle only a few times.

Nearly always the first symptom in cows is general restlessness; the animal moves forward and backward, or stamps; shakes the head, gets up and lies down at short intervals. Every few minutes small quantities of urine and feces are passed, and the cow acts much as when in heat. Now she begins to bellow furiously, persisting sometimes for a quarter to half an hour without a stop.

The eyes are excessively dilated, with the conjunctiva markedly injected and the vessels on the sclera prominent. The expression of the face is that of a combination of fear and anger, an expression that is characteristic of the disease, and which experienced practitioners recognize as readily as the expression of the face in equine tetanus. (In some cases there is some pruritus before other symptoms develop, but we have seen only occasionally itching and rubbing of the location of the wound through which the infection entered. While this may be a regular symptom in other animals we have almost never seen it in our experience with this disease in cattle.)

The cow, if confined, soon begins to make attempts to free herself; she plunges backward and forward, rears up, and performs other acts of violence. If other animals or persons approach her she makes furious attempts to attack them. If an object, such as a broom or stick of wood is held in front of her she fiercely bunts it with her head and grasps it with the teeth if permitted to do so.

If the animal is in pasture or yard she races about, pawing up the earth, and rushing wildly at all who approach. Evidently there is no true hydrophobia (or fear of water) for cows affected with rabies will plunge into creeks, tanks, or other receptacles for water. They are unable to drink, however, because of well-marked dysphagia.

Later, these spells of ferocity, which in the beginning are of short duration become more prolonged and recur at shorter intervals. In all from six to twelve hours are spent in this actively furious stage. The symptoms then become somewhat milder; the cow shows some lack of co-ordination in movement; there is now ptosis of one or both lids, and general evidences of both nerve and muscular exhaustion. After a few hours of staggering about she goes down, lying in odd positions and struggling in convulsions, sometimes for hours, before death comes.

In our cases the whole course of the disease, from initial signs to termination in death, rarely required more than thirty-six or forty-eight hours.

The treatment of rabies is considered hopeless once it develops; the only hope lies in prophylaxsis. Several of the manufacturers of biologicals now have facilities for supplying veterinarians with the preventive treatment of Pasteur; the inoculation for each day is sent by mail in the order in which it is to be used. While the treatment is too expensive for common cows we recommend it in valuable animals that have been attacked by rabid dogs. Animals showing symptoms of rabies should either be permitted to develop the disease fully so that the diagnosis may be made reasonably certain by clinical means, or they should be immediately destroyed and the head submitted to the laboratory for diagnosis. Either of these procedures

makes it possible for persons who have exposed themselves to infection by handling the animal or who have been bitten, to act according to the findings. Either they should submit themselves to the Pasteur treatment *at once* or, if the diagnosis is negative, "forget it." Where there are no laboratory facilities, to destroy the animal before the disease has developed fully, so that it can be diagnosed clinically, is a display of poor judgment.

EFFECTS OF PARTIAL RETENTION OF SECUNDINES

When a considerable portion of the fetal envelopes is permanently retained in the uterus of the cow pathological conditions of various forms develop.

A portion of the after-birth may be retained in the uterus when the cow apparently "cleans" in a normal manner. In other instances portions of the membranes are left in the uterus when the after-birth is extracted manually by inexperienced persons, or even by veterinarians.

The custom of attaching weights to the protruding portion of the after-birth with the object of hastening its expulsion usually results in only partial removal of the membranes and the retention of a greater or less amount thereof.

The most frequent results of a partial retention of the secundines are the following:

1. Uterine Catarrh.
2. Cachexia.
3. Pyo-metra.
4. Sterility.

Catarrh—When the portion retained is relatively small there follows usually a catarrhal uterine discharge which persists indefinitely. The character of this discharge varies from a mucous or slimy fluid resembling the lochial discharge to a discharge of pure pus streaked with blood.

This discharge usually makes its escape when the cow is in the recumbent position, several ounces being emitted daily in some cases. The cow's tail and escutcheon are soiled with the fluid, which later dries and forms a mat of filth. The discharge has a putrid odor and usually cows suffering from this condition can be detected in a herd by this odor alone.

In other instances the discharge escapes only at intervals of two or three weeks, usually about at the normal periods of estrum. While the general condition and well-being of the cow is not affected to any extent as long as the condition confines itself to a catarrhal affection, cows so affected should be considered as giving impure milk. The milk from cows so affected is unfit for human consumption if from no other standpoint than an esthetic one.

Cows suffering from catarrhal conditions of the uterus as the result of partial retention of the secundines frequently become sterile.

The treatment of the condition in this form is no more rewarded with satisfactory results than are the more severe forms, such as when the condition results in cachexia and pus collections, for instance. If the veterinarian is called in while the os is yet sufficiently dilated to admit the insertion of an irrigating tube and the proper drawing off of the fluid, he may be able to obtain fairly good and prompt results from irrigations with warm chinosol solutions of about 1 to 2,000 strength.

These irrigations must be copious, and should be repeated two or three times daily as long as it is possible to enter the tube and properly drain out the solution. If doubt exists about being able to thoroughly siphon off the fluid which it is intended to inject the injections had better not be given. The retention of quantities of antiseptic solutions, or even sterile water, may evoke sufficient irritation and straining to produce severe complications; such, for instance, as vaginal prolapse. Usually the veterinarian does not get the case until the os has contracted so that the opening will barely admit a small finger. In that case we do not advise the use of the antiseptic irrigations, and it is extremely doubtful whether any form of treatment is of actual benefit. The effect of remedial agents administered orally is very uncertain and hardly worth the trouble.

Cachexia.—In some cases resulting from a partial retention of the after-birth we see very well-marked systemic effects. The cow slowly loses weight and gradually wastes away. At the end of several months she is a weak, wabbly critter with a staring coat and general unthrifty appearance. She has become a "boarder," giving little or no milk; as a rule she is barren. If she is carefully fed she may eventually regain some semblance of her former condition. In most instances, however, if she does not develop an acute attack of pyo-metra and die, she is sold to the butcher.

Treatment is far from satisfactory. If antiseptic irrigations of the uterus are possible they can be used with some benefit. Tonics and good feed help some. In *occasional* cases mixed bacterins seem to do much good.

Many of these cases apparently respond nicely to treatment at first, then suddenly relapse. Soon they

reach such a weakened condition that they remain recumbent, dying from decubitus before many days.

Pyo-metra.—In another class of cases resulting from the same cause we see violent, acute symptoms of pus absorption after varied intervals. In these cases the contents of the uterus have no doubt been transformed into a sea of pus. We have repeatedly seen this demonstrated post-mortem.

For several weeks the cow has been exhibiting signs of a partial retention of the after-birth; there has been some discharge from the uterus of a muco-purulent character and the cow has not been thriving. Now she shows unmistakable signs of serious illness; a rigor, with a temperature of perhaps 105 to 106 degrees Fahrenheit. The respirations are shallow and quite irregular; probably ten or twelve rapid respiratory movements are seen, and then a few are performed more slowly, and so on. The appetite is lacking and the cow moans at intervals. She stands somewhat "humped up," and does not care to move about much. The lower commissure of the vulva and the tail over the vulva are soiled with discharges and matted filth. A quite characteristic odor prevails, and when the animal lies down, purulent fluid escapes from the vulva. Death may occur in from one to three or four days, or the cow may survive the attack, becoming a "living skeleton" at the end of several weeks.

Aside from irrigating the uterus when it can be done, the treatment is wholly symptomatic.

Sterility.—Pathological conditions caused by a partial retention of the after-birth very frequently terminate in barenness. Even in very mild catarrhal forms of such conditions it is frequently a very difficult matter to get the cow in calf again; usually several services are required and the animal does not con-

ceive until the catarrhal condition has been terminated.

In some instances the sterility is temporary in character, depending probably upon the relative activity of the diseased condition within the uterus; after one or two seasons of barrenness the cow will again become pregnant. Many cases, however, terminate in permanent worthlessness of the cow for breeding or dairy purposes.

ALOPECIA AREATA

This is a condition characterized by the falling out of the hair in irregular spots on various parts of the body.

The condition deserves mention in this treatise only for the reason that valuable breeding or show animals are apt to be disfigured by the affection to such an extent that their market or showing qualities are injured.

Alopecia areata appears as a purely local disease; no systemic derangement is noticed. It begins with the appearance of small, rounded bald areas, which first appear on the neck and shoulders as a rule. Gradually these bald areas enlarge in size, and fresh spots appear in other regions also. The skin is apparently normal, at least nothing in the form of a skin lesion *per se* can be detected. In aggravated cases the bald areas may reach great dimensions; bare patches of the size of two hands are not unusual.

The treatment of this disease is wholly empirical. In some cases we have obtained fine results from massaging the bald areas with pure cajuput oil, while at the same time a course of alterative treatment was given internally. We can recommend no treatment

which gives constantly uniform results. Many cases resist all forms of treatment and the condition goes on in spite of anything which may be done. Until the pathology of this disease is more fully understood we can hope to make but little progress along the lines of curative treatment.

HERPES TONSURANS

This is an affection of the skin. It is commonly known as "ring-worm."

The form of ring-worm disease which is the most common in cattle is slightly different from that in other animals as regards clinical manifestations. It is characterized by the appearance of layers of bark-like, or almost wart-like, formations on various parts of the body.

The parts of the body most frequently involved are the head, croup, anal and vulvar region, and withers.

The disease commonly is infectious and transmissible in nature, usually affecting a number of animals in the herd. It is transmissible to man also, and the caretaker of infected animals not infrequently develops the disease. It is presumed that the infection is spread by currycombs and brushes and similar agencies. The disease is slightly more prevalent in young cattle than in old ones, and occurs under all conditions of housing as well as at pasture.

The first recognizable manifestation of this malady consists of the appearance of very small, hard and rounded, wart-like nodules. They may make their appearance on various parts of the body simultaneously; usually, however, the different locations become involved successively. In this stage there is some pru-

ritus, which the animal demonstrates by rubbing the part on posts and other objects.

In the course of three or four weeks the nodules increase to a considerable size. They are no longer rounded, but now appear irregularly flattened and raised on the normal skin surface. Their color is of a greyish, ashlike tint, and their thickness sometimes exceeds half an inch. In the anal and vulvar region they usually assume a very irregular outline and frequently occur in clusters in these locations.

The immediate outer edge of the formation is usually free, and a considerable portion can be jerked loose without disclosing any vascular basic attachments. We frequently have seen these bark-like formations assume the size of the hand.

The disease evidently interferes in some manner with the nutrition, because the animals affected lose some weight, almost invariably. This impairment of the usual well-being can hardly be attributed to the irritation which exists because, as a rule, after the nodular stage has been passed there is apparently little or no pruritus.

The treatment of this form of ring-worm disease is quite satisfactory. Those of the formations that are quite loose are forcibly removed and the underlying active base is then painted twice daily with pure iodin tincture. A week of these paintings terminates the trouble here.

The formations which can not be safely extracted because of extensive contact with the dermal tissues are to be soaked several times daily with olive oil to which a small proportion of volatile oil has been added. After five to seven days of these oil soakings most of the formation can be removed without trouble. The exposed active area is then submitted to the iodin treatment twice daily until cured.

In all cases under treatment careful examination of the entire skin should be made frequently with the object of locating fresh foci in the nodular form.

When some of the formations occur on the upper eyelid, where the iodin applications can not be made, powdered iodoform is pressed into the active area after the growths have been removed.

In all cases it is well to apply the iodin over an area considerably larger than the seat of the trouble.

Ring-worm disease should be considered by the veterinarian as a transmissible affection. Animals which have the disease should not be permitted to mingle with the herd in yard or pasture, and separate curry-combs and brushes should be used for them.

If the disease is well established in the herd when the veterinarian assumes charge he should order the disinfection of the stable and then have all posts or other rubbing places either white-washed or painted. If prophylactic measures are ignored it may prove a difficult matter to stamp out the infection. As one case heals up another breaks out, and almost all of the herd may develop some degree of the trouble.

ANTE-PARTUM VAGINAL PROLAPSE

This affection is not rare in dairy practice.

It occurs only in cows which have given birth to several calves; never (or exceedingly rarely) in heifers.

The condition occurs usually in a very typical manner, the only variation in a given number of cases being the extent to which the vagina protrudes outside the vulva. This varies from a mass the size of an orange, consisting of the vaginal floor, to complete eversion of the vagina as far as the cervix or os uteri.

The trouble first makes its appearance as a rounded, pinkish mass which can be seen forcing itself between the lips of the vulva when the cow is lying down. When the cow is standing the mass falls back into normal position and can no longer be seen; nor is it possible, with the cow in the standing position, to detect the abnormality at this stage by vaginal examination.

In some cases the condition does not change much, remaining as a small protrusion of the vaginal floor, that is visible only when the cow lies down. It is terminated with parturition. In other instances, however, the case gradually increases in severity, the mass which protrudes slowly assumes greater dimensions; until towards the approach of parturition it causes some concern. From contact with the floor or edge of the gutter the mass becomes eroded in places. This causes the entire vaginal mucosa to become the seat of a low-grade inflammation. The eroded surfaces have been converted into foul-smelling ulcers, with the result that the cow strains frequently so that the mass now makes its appearance outside the vulva even when the cow is standing. If the cow does not give

birth to her calf prematurely in these aggravated cases there is at least danger of an eversion of the uterus after parturition.

In a small proportion of these cases the parturition proceeds normally without any accompanying mishaps, but the vaginal prolapse persists. In such cases the prolapse sometimes becomes more extensive than before parturition and the constant straining finally is the cause of adding a degree of rectal eversion to the trouble. Only recently we saw a case of this kind.

This cow had had a moderate vaginal prolapse before calving. This persisted after calving and within ten days increased to complete eversion of the vagina to the os uteri, and an accompanying eversion of the rectum, protruding four or five inches outside the anus.

In very mild forms of this condition no treatment is required. The cow does not seem to be inconvenienced in any other respect and usually the trouble ends with parturition. If it is seen, however, that the mass is increasing in size treatment should not be delayed.

Before an intelligent treatment can be applied it is absolutely essential that the veterinarian make a careful vaginal and rectal examination. In this examination we attempt to locate an abnormality in the region which might be responsible for the condition.

First among these abnormalities stand concretions or a catarrhal condition in the sub-urethral diverticulum. Removal of exciting concretions or catarrhal discharges from the diverticulum, with following irrigations of mild astringent and antiseptic solutions satisfactorily terminate some cases.

In other instances an ulcerative condition in the rectum is the direct cause. This must be found; usual-

ly it is not far from the anus. (In one case we saw a necro-ulcerative area affecting the rectal mucosa the size of a small hand.) This must be thoroughly cleaned and cauterized; laxatives and tonics prescribed and rectal irrigations persisted in until the area is healed. The vaginal prolapse disappears with the healing of the rectal lesion.

Where neither the rectal trouble nor abnormalities in the sub-urethral fossa are found, good results frequently come from aiming treatment at vesical tenesmus. Stramonium gives the best results in half-dram doses three times daily. A few doses of salol, about a dram each, in the beginning help to hasten results.

In still other cases the most careful and thorough examination fails to disclose the cause of the prolapse and the condition resists all treatment; but in these and in fact in all cases acetanilid, in rather small doses (one to three drams) every three hours is sometimes markedly palliative and will hold the straining in abeyance until the normal time for parturition arrives; when help must be given the animal to enable her to deliver the fetus. Usually the acetanilid will need to be given only every fourth to seventh day to prevent straining.

In all cases, no matter what the abnormality producing the condition, the veterinarian must not neglect to treat the lesions in the vagina, such as ulcers or other injuries resulting from contact of the mass with the floor while the cow has been recumbent.

When eversion of the vagina occurs in a marked degree in an aged cow in unthrifty condition it is, as a rule, a good plan to consign the animal to the cannery. In the event that the owner requests that something be done in such instances the treatment must include measures aimed at the restoration of the general

well-being, such as suitable tonic treatment, highly nutritious feeds and sanitary quarters. In most cases of this disease in old cows, however, the trouble and expense of treatment render inadvisable the attempt at a cure, that, even in exceptional cases, is usually only temporary or partial. The treatment of antepartum vaginal prolapse requires the exercise of good judgment, from an economic standpoint, in many instances.

EVERSION OF THE UTERUS

Eversion of the uterus is always a very serious condition in cows. A complete eversion of the uterus presents a most discouraging spectacle and in all veterinary practice there is no condition presenting an anatomical displacement of more formidable proportions.

There seems to be no fixed rule or combination of circumstances for the occurrence of this accident in cows. The condition has been seen in range cattle as well as in dairy cattle. One *possible* explanation of an exciting cause might be an exceptionally heavy, and at the same time, completely attached placenta which induces excessive post-partum, expulsive acts.

Aside from this I can point to no particular *direct* cause for this condition. In my experience most of these cases show eversion with the placenta firmly attached; now and then an eversion occurs in which the after-birth has come off. I can recall several cases to which I was called wherein the cow was straining abnormally, apparently in an effort to expel the secundines, which I am positive would have ultimately terminated in complete eversion of the uterus if their removal had not been promptly accomplished by manual

extraction. In these cases eversion had already started; removal of the after-birth with proper flushing and swabbing immediately put an end to the trouble.

The mortality in eversion of the uterus is governed by two chief causes. One is shock; the other infection. But here again no fixed rule can be considered. Those of us who have seen many of these cases can recall deaths with the best of care and recoveries with the most outrageous handling. I recall one instance which was somewhat of a knocker to me when I first began practice. A farmer had a case of eversion of the uterus in a cow shortly before I located for practice. He "merely put it back in," hair, chaff, manure and everything else with it. The cow recovered without missing a feed. Some time after I located in his vicinity he had another similar case and, like a good fellow, called me. I spent ten or fifteen minutes cleaning up the mass with every antiseptic precaution and delicacy before replacing it and gave the cow every care. She died in two or three days. I remember a number of similar incidents.

However, this is no reason why we should allow ourselves to ignore scrupulous cleanliness in treating these cases. I merely mention it to show that recovery or death is not controlled by set rules. All we can reasonably say is that undoubtedly death was due to shock if the death occurred a relatively short time after the eversion took place, say, not more than ten or twelve hours. If the death occurred after a number of days the cows no doubt succumbed to infection. To attempt to prognosticate this cause of probable death is evidence of a lack of experience with these cases.

The treatment or handling of a case of this kind in a tactful, and at the same time, successful manner, re-

quires the exercise of much good judgment on the veterinarian's part. In addition to this good judgment the veterinarian must "keep cool." Veterinarians who never use a cuss-word at other times usually "cuss" just a little when they are engaged in correcting an eversion of the uterus.

My plan of handling these cases is about as follows:

I start with a hypodermic injection of morphin sulphate, from four to six grains. I have a twofold purpose in this morphin injection. The first is to overcome sensibility to a certain extent; the second is to counteract shock. Morphin is now considered the most scientific remedy for combating existing shock.

Having given the morphin injection I proceed to remove the after-birth if it is still attached. When this has been accomplished an attempt is made to cleanse the organ itself. When I say "an attempt is made" I mean that I do not go to extremes in this part of the performance. I have a pail full of antiseptic solution into which I repeatedly dip the hands, slushing the contents wherever any foreign matter is seen on the parts. With a pail full of solution the cleaning can be accomplished thoroughly enough for all practical purposes. A clean sheet or rubber apron is placed under the uterus to keep it clean after the washing is completed.

Up to this point in the proceedings no difficulties of moment are encountered. Now they begin.

I make strenuous efforts to get the cow on her feet in every case after I get through cleaning up the uterus, in those cases in which she is lying down. If she is standing up, of course, one is that much ahead. It is not always possible to get the cow up, but it pays to make considerable effort to get her to arise because, if one succeeds in bringing her to her feet the reposi-

tion of the mass is rendered fully fifty per cent easier.

During the time that the cow is being urged to get up, and when she is in the act of getting up, the uterus must be protected from again becoming soiled. This is best done by wrapping it entirely in the sheet or rubber apron. When the standing position has been attained have the cow moved in such a way that the fore-quarters will be considerably lower than the hind. This is not absolutely essential, but it helps to make the replacement easier.

With an attendant holding the tail out of the way and another man supporting the mass in the sheet or apron, the veterinarian begins the inversion by firmly grasping around the portion closest to the vulva with both hands and forcing it firmly, yet not roughly, into the vulva. At the same time the attendant holding the pendant portion of the mass should "follow up" with it. When the veterinarian has the portion in his grasp forced into the vulva opening, he must not release his grip at once, but slowly, with a sort of "feeding in" motion, and all the time holding in place by forward pressure what he has already replaced, he grasps again with both hands. Sometimes, if the cow strains severely, only one hand at a time is changed for a new grasp. This is repeatedly gone through until enough of the mass has been pushed in so that the attendant finds he has nothing left to hold. The veterinarian now places the doubled fist of one hand in the center of the mass still outside of the canal and by appropriate pressure completes the *in*version, following in the full length of his arm and straightening out the "kinks" as much as possible. The pushing, during the entire process, must be done during the straining *intervals*; that is, while the cow is in the act of straining the veterinarian holds his ground. Then, just at the

moment when the cow relaxes from each strain, is the time to accomplish something.

This I have found the best and safest method for inverting an everted uterus. I have tried other methods, such as have been recommended from time to time by various writers, but find this the best.

If one fails to get the cow on her feet he is compelled to accomplish his object in a very awkward and tiresome position, and usually to complete the reposition, must lie flat. Besides, the resistance to inversion is greater in the recumbent position. In the standing position the last portion of the mass literally falls into place.

In some cases matters are expedited considerably by smearing the vulva and its surroundings thickly with vaseline.

When inversion has been accomplished nothing in the line of a retaining appliance is necessary if the cow is standing up at the time. Straining after reposition is usually due to "kinks," and will not occur if the cow is standing at the time of the replacement. If the cow is down at the time of replacement it is a difficult matter to properly straighten these "kinks" and straining usually occurs.

Even in the latter cases I use no retaining appliances. I make ever effort to get the cow on her feet as soon as the organ is in place and then have her placed with the hindquarters raised.

Sutures through the vulva, rope trusses and other appliances have little value. I never use them. When a cow strains after I have replaced the mass I know that there is still a portion of it being pinched by a partial inversion. If it cannot be reached with the hand and forced into normal position the best plan is to pump the cavity full of warm antiseptic solution.

The straining will stop as soon as the "kinks" straighten out.

Tonics are to be given as after-treatment, and *always* a prophylactic dose of mixed bacterius to forestall infection. The treatment of various complications or sequelæ is left to the professional judgment of the attending veterinarian.

STRANGUARY FROM CONCRETIONS IN THE SUB-URETHRAL DIVERTICULUM

This is a condition which occurs in cows of moderate and old age and may become evident in some cases within a month or two after a difficult parturition. The latter form is probably the result of uterine discharges or debris, such as hair, being forced into the diverticulum during the difficult labor and acting as an excitant to its lining membrane. The resulting catarrhal excretions collect around the debris as a nucleus, forming sometimes in the course of two months, a concrete mass of the size of a hen egg.

In other instances the concretion may be due to the collection and inspissation of catarrhal discharges from no particular cause.

These concretions have the appearance of and are of nearly the consistency of coffee grounds. Here and there in the mass can be seen white flakes which are somewhat firmer than the other portions.

The elaboration and retention of concretions in the suburethral diverticulum produces no objective symptoms until the mass has attained sufficient dimension to interfere with the exit of urine from the urethra. When this stage has been reached the cow does not urinate quite as freely as she should; she requires a

little more time than usual to complete the act, and instead of the normal gushing flow it is seen that the urine comes in spurts, an ounce or two at a time. This may go on for several weeks without attracting much attention from the owner, and without increasing in severity to any great extent.

This condition persists for a variable period depending upon the rapidity with which the mass is growing in size, and then it suddenly assumes an alarming character. The veterinarian is called and he finds a case about as follows:

The cow appears in acute pain, constantly getting up and lying down. When up, she paws and kicks at the abdomen. She ignores her feed. So far it looks like a case of colic. It is now noticed that a very thin stream of urine is almost constantly escaping from the vulva. Every few moments the cow assumes the position for micturition but the stream of urine which she succeeds in ejecting is very small. The vulva is agape and appears congested.

As the symptoms now point to a local trouble in the vagina the veterinarian makes an examination here. The hand is passed in, and when it has entered as far as the knuckles the finger tips come in contact with what at first is taken for some sort of a cauliflower growth. It seems to stick straight upwards and backwards and is movable. While the fingers are feeling for anatomical land-marks a jet of urine shoots up from behind the enlargement and the diagnosis is readily made. If the hand is passed into the vaginal canal somewhat deeper the veterinarian discovers that the bladder is filled to the limit of its capacity.

The treatment consists of mechanical removal of the concretions. Usually it is necessary to begin the removal with a blunt curette. After a good start has

been made with the curette the removal can be completed with the finger.

Immediately the mass has been removed the cow urinates normally and begins to eat. All signs of acute pain disappear instantly, although the cow may strain slightly for some time. A few small doses of fluid extract of stramonium suffice to overcome the latter. Stramonium seems to have a selective action on the parts responsible for symptoms referable to vesical irritation.

DOUGLASS' POUCH CYST

Cyst formation in the loose tissues between the rectum and vagina is a pathological condition which occurs chiefly in young cows and heifers. Unless the veterinarian is a close observer and makes it a rule to include a rectal examination in his diagnostic efforts, especially in cases pointing towards bowel trouble, he frequently fails to recognize the exact manifestations of this condition. A superficial system of diagnosis usually confuses the symptoms of a cyst in the pouch of Douglass with colic.

A cyst in this region may attain enormous dimensions, containing on occasions a gallon of fluid. No symptoms are produced, however, until the cyst has assumed such size that it mechanically interferes with defecation or micturition.

When this stage has been reached the veterinarian is usually called in, and he finds the animal presenting some symptoms of an ordinary colic. There are some points of differentiation, however. The chief one is that the cow keeps her tail raised almost constantly, and repeatedly strains, apparently in attempts at defecation. No feces are passed, however, and if

the case is of long standing or has been neglected, there may be the beginning of an eversion of the rectum.

The cow is considerably distressed, breathing rapidly, and sometimes moaning while in the act of straining. She stands up and lies down at intervals, and when lying down she usually stretches out, flat on her side, moaning and straining. In nearly all cases there is a marked degree of tympanites.

The diagnosis can be made only from examination per rectum. When the hand is passed into the rectum it will not enter more than the length of the fingers, or, at most, to the wrist. The floor of the rectum is pushed up in the form of a smoothly rounded swelling so that it is in contact with the sacral region. The first thought which this arouses in the surgeon's mind is of a fully distended urinary bladder. However, when he passes the catheter and withdraws the urine from the bladder, he discovers that the swelling in the rectum has not diminished a particle. The diagnosis of a cyst is therefore certain and the treatment comes up for consideration.

The treatment of these cases is entirely surgical and is confined to tapping the cyst, allowing the contents to escape. In most cases the cyst content is a watery, yellowish, odorless fluid; if it were not free from odor it might pass for urine as far as appearance goes.

The best results are obtained by tapping the cyst through the floor of the rectum. A trocar and canula and a piece of rubber tubing is all that is required. The best trocar for this purpose is an ordinary horse trocar, such as is used in tapping the cecum. The rubber tubing should be of such calibre that it passes over the head of the canula easily.

The operation is best performed with the cow in

the standing position, with a rope adjusted above both hocks to prevent the veterinarian from being kicked when the trocar is thrust into the cyst.

After having copiously anointed the anus and rectum with a lubricant, such as vaseline or lard, the trocar and canula guarded in the hand is passed into the rectum. The point of the trocar is set at a place about one inch higher than the *normal* floor of the rectum, directing it towards the cow's sternum, and plunging it into the cyst with one thrust to the depth of two or three inches.

The trocar is drawn out of the canula as soon as the cow has ceased struggling. The cyst contents spurt through the canula immediately and into the rectum as long as the veterinarian protects the mouth of the canula with his hand. When he withdraws his hand the rectal folds either envelop the mouth of the canula and shut off the flow, or under the influence of the rectal tenesmus the canula is pushed too far into the cyst. To obviate this we slip the rubber tubing over the end of the canula after withdrawing the trocar, leaving one end hanging out of the rectum.

When the fluid begins to run out more slowly pressure exerted on the cyst, with one hand in the rectum and the other in the vagina, is applied with success in entirely emptying the cyst. The canula is then withdrawn with a quick jerk.

No further attention need be given the case. Relief is instantaneous and lasting. The animal begins to eat and is entirely normal at once, unless the case had been neglected; when it may be necessary to administer a laxative to overcome constipation which has developed.

In our experience one thorough draining is all that is necessary; the cyst does not become distended with fluid a second time.

PHYMOSIS

Phymosis, or imprisonment of the penis in the sheath, occurs in bulls as a distinct clinical phenomenon. Aside from direct injuries there are probably two chief reasons for the frequency of its occurrence. One is the fact that micturition is commonly performed in the sheath without protruding the penis; the other is the superabundance of long, heavy hair at the preputial orifice. The anatomical proportionment of loose, flabby tissue around the prepuce is not ample, allowing but little space for infiltration with inflammatory exudates and fluids. Even moderate swelling in the prepuce of the bull markedly diminishes the size of the opening which is normally not very large in a relative sense. The presence of the hairy tuft which surrounds and depends from the orifice favors the retention of filth and the development of infections.

Phymosis makes its appearance, usually, in a rather rapid manner. A firm, rounded swelling is seen along the sheath, from the orifice to ten or twelve inches posteriorly. When fully developed the swelling may involve the subcutaneous tissues in front of the sheath so that the orifice appears to lie flat against the abdomen.

There is a discharge of muco-purulent matter or even of thick pus, which sticks to the hair around the parts, making, before long, a matted, filthy barrier to drainage.

If the swelling is of sufficient intensity to seriously interfere with micturition the bull shows mild colicky pains as a result of distention of the urinary bladder. If the condition has been neglected for several days

the pains increase in severity, the respirations are hurried and shallow, the temperature rises several degrees and the animal refuses its feed. A bull suffering from a well developed phymosis is a sorry brute to look upon.

The treatment of phymosis is quite satisfacory and a favorable termination is the rule.

While it may considerably facilitate the handling of the parts we do not advise that the animal be cast. It is not possible to determine the extent of the distention of the urinary bladder and there may be danger of rupturing the bladder by casting the animal. At least, the first treatment should be given in the standing position. When the condition has been sufficiently relieved to permit of micturition the animal can be cast for subsequent handling if conditions exist which require it. Usually, however, it is unnecessary to cast the patient if the manipulations called for are performed in a gentle and painstaking manner.

The treatment begins with cutting away the hair in the region of the preputial orifice, for which purpose an ordinary curved scissors answers very well. All filth and adhering discharges are then to be thoroughly removed by means of warm antiseptic washes. The latter must not be too active; the parts are normally very sensitive and this state of sensitiveness is all the more marked under the influence of the pathological condition. If mercury bichlorid is used, a 1 to 4000 solution is ample. When the mouth of the orifice and its immediate surroundings have been thus cleansed the interior of the sheath must be copiously irrigated with warm antiseptic solutions. In our hands we have had fine results from solutions of potassium permanganate here. Half a dram of the crystals dissolved in a quart of warm water makes about the prop-

er strength solution to begin with. As the acute stage disappears the strength can be gradually increased, until towards the end of the treatment a dram of the crystals can be used to a quart of water.

To make these irrigations effective it is almost absolutely necessary to use a fountain syringe.

It may be difficult in some cases to use any style of syringe successfully unless a very small nozzle is used. The opening in the sheath has closed to such an extent that a thick nozzle will not permit the return flow of the fluid. Several quarts of antiseptic solution should be used at each irrigation and the irrigations are to be repeated at least three times daily. If the proper strength antiseptic is used and the irrigations are thoroughly carried out, marked improvement is evident after two or three applications. If the treatment is persisted in conscientiously, with appropriate internal treatment, for three or four days, the irrigations are only necessary once or twice daily for another two or three days thereafter, when the case can usually be considered cured. Even very severe cases of phymosis can be carried to a successful termination in from a week to ten days.

We have never found it necessary to make surgical incisions for drainage, nor to enlarge the orifice so as to permit the use of larger syringe nozzles. Gentle, patient manipulations usually suffice to accomplish the desired end.

For the internal treatment we can highly recommend doses of phenyl salicylate half a dram to a dram, with fluid extract of belladonna half a dram and fluid extract saw palmetto half an ounce. Three such doses are given daily for two or three days and once or twice daily thereafter, until the case is discharged.

If the case should come into the veterinarian's hands

in a precarious condition from retention of the urine, so that danger of losing the animal's life were imminent, we would recommend tapping the bladder through the rectum as the first procedure.

ACUTE, SIMPLE AGALACTIA

In dairy cows a condition frequently occurs which can only be described as an acute, simple agalactia.

This trouble is usually sporadic in nature, affecting a single cow now and then without any apparent cause.

The history in these caess is nearly always the same. A cow that is otherwise a good milker suddenly gives only about half the usual quantity and at the very next milking is almost completely dry. In every other respect the animal appears normal; eats well, drinks, appears bright and well. Quite careful examination on the part of the attending veterinarian fails to detect any abnormality of value from a diagnostic standpoint.

It is usual to suspect something wrong with the feed, but this suspicion is discarded because all the other cows in the herd are getting the same feed and are not affected.

Apparently this is a condition induced by trophic nerve disturbance of an obscure character. It is always a purely functional disease; no inflammatory or congestive signs occur in the udder which can be determined clinically. The one and only symptom is the absence of lacteal fluid.

The treatment of this condition is based wholly on this aspect of the pathology of the disease—namely: that it is a purely functional abnormality, and the

treatment is very successful. It is quite important that the case be taken in hand promptly because, to a great extent, the degree of functionating which again develops as a result of the treatment depends upon the length of time that the glands have been idle. A case of this kind properly treated within a day or two after the milk secretion stops will usually come up to the normal output of milk again.

The treatment consists wholly of the administration of two well known alkaloids, pilocarpin and strychnin.

Four grains of pilocarpin hydro-chlorid and two and a half grains of strychnin sulphate are dissolved in a pint of water. This is divided into three doses, one to be given orally every three hours.

Nothing further is required and usually the glands resume their function promptly. Changed feed or special feed does not seem to hasten recovery in these cases. The fact that such feeds which are in ordinary cases more or less of a galactogogue have no effect in this disease is further evidence that we are dealing here with a trophic nerve disturbance more than anything else.

MASTITIS—MAMMITIS

These terms are applied indiscriminately to acute inflammatory conditions attacking the mammary gland.

Mastitis or mammitis is serious because of its economic import in dairy cattle and the veterinarian's efforts in treating this disease are concerned chiefly with conserving the function of the gland. Almost without exception, even with approved treatment and most careful handling, severe attacks of mastitis ultimately impair the function of the gland involved.

For the purpose of this discussion we shall ignore the various forms of mastitis which are looked upon as specific in character, such as infectious mastitis, tubercular mastitis, and so on. We shall concern ourselves solely with what we would term sporadic mastitis, that form which is always seen in isolated instances in cows which are being heavily fed for milk production. Sporadic mastitis makes its appearance most frequently in heavy milkers and is probably most common in the first two months after calving.

Most cases begin with a chill which, after variable periods of time, terminates in rigors confined to the posterior part of the body. The cow refuses all feed and appears generally indisposed. There is usually constipation and the temperature is but one or two degrees above normal. (This is a good clinical point of differentiation between sporadic and infectious forms of mastitis—namely: that in sporadic mastitis the temperature is raised only a trifle; in infectious forms fever runs high.) In nearly all cases there is some stiffness in one hind leg which could almost be called a lameness. In the early stages the local signs

of inflammation are usually confined to one quarter of the udder; later both quarters on one side, or both front or rear quarters, may be involved. In rare cases the entire udder is involved.

In sporadic mastitis the part involved is the seat of a uniform, firm swelling which is very painful under manipulation. There is considerable local heat and the skin over the quarters involved appears much reddened and tense. The lacteal secretion is diminished; in some cases it is almost completely suspended. When the veterinarian strips the teat on the affected quarter to ascertain the character of the secretion, he finds that the first spurt or two has the appearance of water into which a drop or two of fluid extract of nux vomica has been dissolved. Following this the fluid that is stripped out has more the appearance of milk, but it contains clots and flakes. Cows that are otherwise gentle and kind milkers will resist handling of the parts affected.

If the condition is not promptly and judiciously treated, pus formation and abscesses may supervene.

Before taking up the treatment of mastitis we would like to impress upon the reader our understanding of the term "infectious mastitis." By infectious mastitis we understand that form of this disease which is more or less readily communicated to other cows. We make this point clear so that the reader may not get the impression that we consider sporadic mastitis idiopathic. Sporadic mastitis is usually due to infection with micro-organisms of the pus-producing group, but it is not infectious in the sense of transmissibility or contagion.

The treatment of sporadic mastitis at the present time includes a great variety of remedial procedures. It can safely be said that there is at the present time

no generally practiced or accepted method of treatment. Nearly every veterinarian has his own ideas and method of treating this condition. In our own practice we have had recourse to a considerable number of therapeutic measures such as have been recommended from time to time, and we confess that we have not been very successful in treating mastitis with any of them. Neither have we been able to work out a uniformly successful treatment of our own. While we are able to obtain moderately satisfactory results in most cases, we can not say that we have a treatment for this disease which is equal to the demands made upon it by the condition. We mean by this that we are not quite sure of our success in preventing interference with the function of the gland. It is by this success—namely: that the cow may be as good a milk producer after the attack as before—that the real value of treatment is measured.

As we said in beginning, mastitis is important from an economic standpoint chiefly because it has a tendency to permanently interfere with the output of milk. It is not an exceptionally difficult matter to subdue the acute manifestations of the disease; but it is a very difficult matter to so conduct the treatment that the gland may escape permanent impairment of function.

The method of treatment which has given us the best results begins with a cathartic dose of arecolin or eserin. The earlier in the attack this cathartic is given the more gratifying the results.

Following on this, hot fomentations are ordered applied to the affected gland, at least fifteen minutes out of every hour, for twelve or fifteen hours. The affected quarter is to be gently milked out each time before applying the hot water. Also, during the same

period, we order that a dose be given every two hours consisting of a half ounce of sodium bicarbonate and of fluid extract taraxacum and of rhubarb, each an ounce.

At the end of this twelve or fifteen hour period the cow is usually quite comfortable and the acute manifestations of the disease are well under control.

With this, as with all other treatments which we have used, the case has now assumed a sort of mediocre or sub-acute status. While the animal is free from pain, eats well and is apparently on the road to a rapid recovery, we find that from now on progress is slow. In this stage we use an ointment of phytolacca locally and potassium iodid internally, continuing both for a week at least. It is not rare to meet with cases of this disease which are exceptionally stubborn towards recovery and the veterinarian's skill as a physician is taxed to the limit before he succeeds in conquering them. In such cases polyvalent bacterins frequently do much good.

The cow should be on half rations during the entire treatment.

ATRESIA OF THE LACTEAL DUCT

Atresia of the lacteal duct is commonly termed teat stricture. The occlusion is usually a partial one, rarely complete. The seat of stricture or closure may be at the teat orifice, along the course of the duct, or at the proximal end of the duct where it emerges from the sinus lactiferus.

When the stricture is located at the apex, or near the distal end, the milk enters the teat quite readily but difficulty is experienced in squeezing it out; the stream is very thin, or it squirts in several directions.

When the stricture is farther up, or at the proximal end, difficulty is experienced in getting the milk to fill up the teat; after the teat is filled it is ejected easily.

In rare cases, which may occur in heifers, there is a true atresia or closure of the duct orifice in the end of the teat. There is only a slight pit or depression in the epithelium, at the point where the duct normally emerges, but the epithelium is not perforated.

With two exceptions, strictures of the teat have an unfavorable prognosis. One exception is that form occurring at the very extremity or external orifice of the duct; the other exception is that form appearing as a true atresia in heifers.

In the various forms involving the duct higher up and at its proximal end the treatment is not very well understood nor accompanied by satisfactory results. Of course, there are cases of the latter variety occasionally which have a satisfactory termination, but they are rare. The treatment which is in vogue for these conditions (and to all appearances as good as we can do) is fraught with danger from the stand-

point of sequelæ, of which mastitis is the most important.

The various operations which have been recommended and quite thoroughly tried out, as well as the different types of bistuories and dilators, have not proven of much value in general practice. It is almost an absolute necessity to have hospital facilities for the proper and conscientious performance of the measures required to correct a high stricture in the lacteal duct. It is decidedly humiliating for the veterinarian in general practice to see a severe mastitis succeeding manipulations for the correction of a condition which, to the farmer, seems a trivial matter.

In our practice we refuse to treat a high stricture of the teat until we have clearly explained to the owner what the chances are. We make it clear to him that rarely is any form of interference attended with results which are so satisfactory as to warrant the attempt; that in many instances a severe mastitis, which will probably destroy the quarter, will supervene. If, after this warning, he is still willing to submit the cow to treatment, we attempt dilatation, and in some cases incision of the stricture. We have not enough faith in any procedure for the correction of this condition, with which we are familiar, to give it space here.

In those cases which involve the apex or distal end of the duct we can obtain good results with fair regularity. We have met with two forms of the condition in this part of the duct. One form is a true stricture or narrowing of the lumen of the duct, probably as the result of infectious or other inflammatory processes. In this form we are able to obtain good results from dilatation. It is not very important how this dilatation is accomplished, so that it is done aseptically and bloodlessly. We use an ordinary teat dilator, repeat-

ing the stretching every few days. The best method is to dilate and allow the duct to collapse repeatedly, from six to ten times at each treatment. Insert the dilator, expand it as far as indicated, and then hold it there for one or two minutes; take it out, wait a couple of minutes, and repeat. Do this from six to eight times at each sitting, and in a few days again. Three to five of these courses of stretching accomplish the desired result.

The other form which we can also treat successfully is a narrowing of the orifice of the duct from collections of evaporated mucus or similar concretions. These collect just inside the edge of the orifice and are of the consistency of dry putty. When an instrument is passed over them, a faint, scraping sound can be detected.

They are to be very gently removed with a small eye curette or an ear spoon, and the parts are then to be given an application of glycerin by means of a cotton swab.

Cases of true atresia of the distal end of the lacteal duct which occur occasionally in heifers can also be treated with very satisfactory results. The duct is perfect except for the appearance of the orifice through the skin.

When the teat has been thoroughly cleansed, the pointed stilet of an exploring trocar is used to puncture the skin. This puncture is made exactly in the center of the pit, which is always present, and just deep enough so that the point penetrates the skin. With slight pressure, but not enough to cause the stilet to enter deeper, it is turned from right to left, and from left to right a few times. It is then withdrawn and laid aside. A small sharp curette is now used to enlarge the opening until it is of such size that a

milk tube will readily pass through it into the duct. A little pressure may at first be necessary to enter the point of the tube in the duct.

A small strip of gauze saturated with glycerin is then forced a short distance into the duct and allowed to remain, with an inch or so protruding. This strip of gauze is removed after twenty-four hours and the heifer milked regularly.

The restraint for this operation is always to be in the recumbent position. If the operation is deftly performed it is practically bloodless.

In heifers this operation should be performed just before or immediately after calving.

We would call the veterinarian's attention again, before closing the discussion, to what has been said, about high strictures of the teat. Our experience is that the veterinarian can serve his client best in most of those cases by advising that the condition be left alone, letting that particular quarter go dry.

LACTEAL FISTULA

Lacteal fistula appears in various locations on teats and udder. The most common seat of a lacteal fistula is on the teat over the course of the lacteal duct.

Most lacteal fistulas are of traumatic origin; occasionally abscess formation in mastitis may leave a permanent opening in the udder through which milk escapes.

In rare cases rudimentary teats near the base of a teat may develop a permanent opening, allowing a constant dripping of milk. Some cases have occurred in our practice which resulted from cutting off rudimentary teats. The animals were pure-bred cows and the owner feared that the rudimentary teats would detract from their showing qualities. He snipped off the rudimentary teats with scissors. Evidently the teats contained a lacteal duct, which continued to drip milk constantly, after being cut through.

A lacteal fistula is difficult to heal when chronic, especially while the gland is active. The proper time to undertake the cure of a lacteal fistula which has been in existence for a month or longer is when the cow "goes dry." While it *is* possible to obtain good results while the cow is being milked, no certain promises of a favorable outcome should be made.

In cases which are of less than one month's standing, good results can be obtained at any time. The treatment which we recommend is the same for recent and for chronic cases—the only point differentiating one from the other being the time when the treatment is used—namely: in chronic cases only during the interval between lactation periods; in recent cases, at any time. To apply the treatment properly the cow

should be cast, unless she happens to be a very gentle one.

The affected teat is to be washed thoroughly with soap and warm water and then dried and a local anesthetic used. A milk tube, of the self-retaining variety, and of sufficient length to reach the whole length of the teat, is then inserted. With a small, sharp curette the walls and edges of the fistulous opening are now thoroughly scarified, and any indurated tissues on the surface edges are removed. When this has been thoroughly accomplished all hemorrhage, which is sometimes considerable, must be controlled by pressure and wiping, before the next step is taken.

When the hemorrhage has ceased, at least so far that it amounts to only a slight oozing, the wound is given a light application of tincture of iodin with a cotton swab and applicator.

The last step consists of snugly wrapping the entire teat with layer after layer of gauze strip, interposing between each a coating of pine tar. A two-inch gauze bandage is about right.

We first apply a coat of pine tar directly on the teat around its entire surface from top to bottom. We then begin bandaging on top of this, and, as the bandage is applied, we apply a coat of the tar after each lap, until about seven or eight layers of both tar and bandage have been applied. The bandage must be drawn just "good and snug," not too tight nor too loose. The milk tube is yet in the duct and allowance must be made for it—namely: that the bandage will be "just snug" when the tube is pulled out of the teat. When seven or eight turns of the gauze bandage have been applied, it is tied, or sewed, to the last turn. Another layer of tar is then applied over all.

The milk tube is now removed and the cow allowed to get up.

In recent cases this bandage may be removed at the end of ten days or two weeks, when the fistula is usually entirely healed. In chronic cases three to four weeks should elapse before removing the bandage. The removal of the bandage is facilitated by first saturating with alcohol, after which it may be unwound gently. If the layer in contact with the teat sticks tenaciously it should merely be saturated with alcohol and then allowed to drop off of its own accord, a thing it will do after a few days.

The above is not an ideal or very scientific performance, but "it works" *every time* if the bandaging is correctly done.

In our hands, classical surgical procedures have been failures in this condition.

Lacteal fistulas resulting from meddling with a rudimentary teat or from a rudimentary teat which has begun to leak can only be cured by direct surgical interference.

In such cases the cow is cast, and the region of the fistula is thoroughly cleansed with soap and warm water, and rinsed with antiseptic solutions. The mouth of the opening or fistula is then swabbed thoroughly dry with cotton and a local anesthetic injected. The rudimentary duct is now grasped on one side of its edge with rat-tooth forceps and dissected loose from the wall of the teat or udder. A new hold is repeatedly taken with the forceps, around the entire circumference of the duct, and the duct dissected inward to a distance of at least half an inch. Great care must be taken not to prick through the duct with the point or edge of the knife.

When the duct is dissected free from its surroundings to the depth of half an inch, a catgut ligature is applied around it, close to the proximal end. Just before the ligature is tied, the duct is swabbed with turpentine, the latter for the purpose of setting up an irritation to hasten the formation of adhesions. The external wound is treated as an injury and heals promptly.

Unless the operator has been unclean in this operation the results will be all that can be expected.

The ligature requires no attention, and all trace of the fistulous opening gradually disappears. The turpentine swab must not be forced into the duct too far, as in that event it may do harm in the glandular portion. Some rudimentary teats appear to obtain their duct directly from the acini instead of from the sinus lactiferus.

VARIOLA (Cow Pox)

This disease, in cattle, runs a mild course in nearly every instance and, in this country, may be looked upon as being confined almost wholly to the udder. Now and then a case occurs in which the animal shows slight systemic derangement.

The disease affects sometimes only a few animals in a herd; at other times none escape the infection. This feature is probably influenced to a great extent by the sanitary or insanitary methods of milking in vogue on different farms.

The first symptom is soreness, or tenderness, evinced when the cow is milked. The teat or teats feel hot and slightly swollen. Soon after this, nodules develop on the teats and on the udder of about the size of peas, usually. In a day or two these become vesicles of a bluish or purplish color. The vesicles break down, leaving under them the characteristic pox "pit," showing granulations. The tissues immediately around the pit are injected and tender. Soon the pit becomes covered with a scab, which drops off in four or five days, and the disease has run its course.

If the milking is not done in a cleanly and gentle manner while the pit is yet uncovered, extensive ulcers sometimes form.

The vesicles do not all appear at the same time and several weeks may elapse before any one cow is entirely free from lesions. The infection frequently is contracted by the persons doing the milking. Pimples, which break down and end in scab formation, appear on the hands and wrists. They heal kindly and usually cause no other trouble.

The most important point as regards the treatment of variola in cows is the observation of cleanliness and gentle manipulation of the teat in milking. If the teat contains a great number of vesicles a milking tube should be used.

Scab formation can be hastened by touching the pits with a saturated solution of potassium permanganate. If extensive ulceration occurs, the parts are to be painted after each milking with a mixture of one part tincture iodin and three parts tincture benzoin compound. The number of cases in an outbreak can often be limited if cows affected are milked last, thus avoiding direct transmission of the disease.

CHAPPED OR CRACKED TEATS

This condition varies from slight degrees of erythema to extensive involvement of the sub-dermal tissues.

When the condition has been allowed to become chronic so that the teat is the seat of deep cracks or fissures it may prove quite resistant to treatment. The repeated stretching and other manipulations to which the teat is subjected during the process of milking greatly hinders the healing process.

When the condition is confined to the superficial skin good results can be obtained from compound tincture of benzoin applied with a camel's-hair brush after milking. Three or four days of such treatment effects a cure. In those cases which are of long standing and in which cracks and fissures of considerable depth are present, we have obtained the best results from solutions of chinosol in 1 to 1000 strength. After each milking a cup or a tumbler is filled with the solution into which the affected teat is plunged, holding the cup or the tumbler so that its rim rests against the udder. At least five minutes should be consumed in the bath in this manner, after each milking.

In many quite severe chronic cases three or four of these baths or soakings produce a marked improvement and a week of such treatment usually suffices to bring complete healing. In exceptionally severe cases it may help to hasten matters if the cracks are first lightly cauterized with a mild solution of silver nitrate.

In occasional cases, those usually termed "sore" teats, the lesions are arranged in patches, some of

them running almost entirely around the teat. In these cases there is a tendency toward scab formation and, occasionally, ulceration. In this form we begin the treatment with an application of one part tincture benzoin compound in three parts glycerin, applying it frequently during the day with a soft brush. The glycerin softens and dissolves the scabs, and leaves a healthy looking sore. The treatment is then terminated with the chinosol baths.

In very obstinate or severe cases of chapped, cracked or sore teats, it may be impossible to effect a cure unless a milk tube is used in place of milking by hand.

PNEUMONIA

For this disease in cattle we would prefer the word pneumonitis, because from the standpoint of treatment the word pneumonitis is specific. The veterinarian in daily practice who comes actually in contact with this disease in cattle does not pay much attention to the particular form of pneumonia a given patient may be afflicted with. To the practicing veterinarian pneumonia is an inflammation of the lungs, pneumonitis, and that is sufficient for practical purposes.

Probably a minority of the actively practicing veterinarians, although they treat, successfully, several dozen cases of pneumonia each season, can differentiate the various forms of pneumonia either in words or in clinical application.

The secret of success in treating pneumonia in any form lies in early recognition or diagnosis. The best that any treatment can do in pneumonia is to lessen the severity of the attack, and it can do this best when the disease is just developing. It is now quite generally accepted that pneumonia, once it asserts itself, can not be aborted. On the other hand, correct and judicious treatment instituted early in the attack can make of this disease a reasonably moderate attack of sickness.

In our own practice pneumonitis in cattle does not cause us much worry if we have been called reasonably early. We usually have little trouble in giving quite an exact prognosis and as a rule see it verified almost in detail. When we are not called in early in the attack, we have learned from experience to guard our prognosis decidedly.

The diagnosis of pneumonitis in cattle does not offer much difficulty. In most instances the attack begins with a chill or rigor which may remain in evidence only a few minutes. In other cases it may remain for several hours; usually, however, it does not persist for any great length of time, and has passed by the time the veterinarian sees the patient.

The animal stands slightly "humped up" and almost from the very beginning the elbows are turned outward. The body temperature is elevated several degrees, standing when the chill has passed around 104 degrees Fahrenheit, or even a little higher.

Auscultation over the thorax reveals distinct rales, and pressure exerted over the intercostal spaces always proves painful to the patient. In the early stages the cow will maintain the standing position, but later in the attack she assumes the recumbent attitude for long periods at a time. When in the latter position she usually emits a characteristic grunt.

The appetite is impaired as a rule and in the latter stages there may be a discharge from the nose. In most cases there is a certain degree of constipation at first; later there is apt to be some diarrhea.

The treatment of pneumonitis consists of remedial agents which have a tendency to support the system, especially the heart, and appropriate sero-therapy to control secondary infections, such as result from the invasion of pus-producing organisms. Measures used to exert a direct action on the pathological condition are, as a rule, failures.

The treatment which we have adopted and used with much satisfaction for a period of years is about as follows:

We start the treatment, no matter in what stage the case comes into our hands, with an old fashioned

mustard plaster. We make this mustard plaster by stirring a pound of powdered mustard into a thin paste with hot water, which is then rubbed briskly into the hair over both sides of the thorax and along the course of the trachea from the larynx to the breast. This application causes only slight irritation in cattle and lasts for about a half hour, during which the animal usually trembles a little and paws some with one foot or the other.

We make no attempt to remove the mustard after it has served its purpose, allowing it to dry and come off of its own accord in time. Medical treatment we limit to one dram each of fluid extracts of nux vomica and gentian root every few hours during the day. If a cough is present we add to this a quarter dram of fluid extract of belladonna. On the first day of treatment, and again on the fourth day, we inject a dose of polyvalent bacterins hypodermically.

If the appetite is very much below par we double the dose of the nux vomica until the cow eats; then reduce it to one dram again. We see to it that the patient is stabled under hygienic conditions and supplied with tempting feeds. Really, the best index to the condition of a bovine patient suffering from pneumonitis is the appetite. If the veterinarian can contrive to keep the patient eating regularly and quite heartily he is doing well.

The foregoing comprises the sum total of our treatment in pneumonitis in cattle. We pay no attention to reducing the temperature with coal-tar preparations or other febrifuges. If the temperature persists at a dangerous height, we find the administration of intestinal antiseptics most serviceable. When confronted with this state of affairs we give a few large doses of sulpho-carbolates compound, usually about

forty or fifty grains each of calcium, sodium, and zinc sulpho carbolates at one dose. This dose we repeat at intervals of three or four hours until four doses have been given.

With this treatment most of our cases terminate satisfactorily in from seven to ten days. We rarely have complications—in fact, practically none—and while the past year or two has shown us some fine results with sparteine sulphate in this disease, we have more faith in this old system.

Spartein sulphate is used in twenty-grain doses every three or four hours in pneumonitis, and its effect is very gratifying. I have extolled its merits and given details of its effect in "Special Veterinary Therapy."

TUBERCULOSIS

We hesitate to undertake the discussion of this disease in a treatise on special therapy. We feel that in the space available justice can hardly be done to a disease which presents such a variety of clinical phenomena as this one. Yet, any treatise on the most common diseases of dairy cattle would be most glaringly incomplete did it not include a discussion thereon, for tuberculosis is most assuredly one of the most common diseases of dairy cattle.

The longer one is engaged in the practice of veterinary medicine the more does he become impressed with the great variability and the constant modification or aggravation of the clinical signs of this disease. Also, the more extensive one's experience with this variability of clinical evidences of the disease the more impressed he becomes with the idea that tuberculosis is practically universal. One finds it where it is least expected, and one finds more than he expected to find wherever he finds it.

The diagnosis of tuberculosis is limited only, in our opinion, by the diagnostic acuteness of the diagnostician. We vividly recall an experience we went through in the great Southwest, where tuberculosis is *not* common in native cattle. A dairy near the city of El Paso, Texas, milking around five hundred cows, was forced by city ordinance to submit the herd to the tuberculin test. The dairy was a model from a sanitary standpoint, was hygienically conducted in all departments and the cows themselves were almost daily under the eye of a veterinarian. The cows, mostly Holsteins, were almost all bought in Northern states. While we knew that the herd had a number of tuber-

culous members, we were not prepared for the most shocking disclosures made by the tuberculin—namely: that out of four hundred and fifty cows tested one hundred and seventy-two gave a decidedly positive reaction.

Veterinarians long engaged in practice are never surprised by results obtained with the use of tuberculin; they have seen cows react under such a great variety of circumstances and conditions of environment that they *always expect* to find it.

In this place we must confine our remarks, however, to those clinical manifestations of tuberculosis which the practicing veterinarian may encounter in the individual cow in the daily rounds of practice; those manifestations which must attract his attention to the tubercular character, or nature, of more or less usual pathological states.

We are but little concerned with the tuberculin-testing of cows in herds, because, when we once arrive at the tuberculin application, we are *expecting* to find tuberculosis. Our task, in this treatise, is to attempt a discussion of those marks which should demonstrate the necessity of the tuberculin test in cases where we do *not expect* to find it. And it is indeed a task to make the discussion both intelligent and brief.

To begin with, the veterinarian whose practice brings him in daily contact with herds of dairy cattle or, to express it more specifically, with the individuals of those herds, must be constantly on the lookout for manifestations of tuberculosis. If he relaxes his guard in this respect in any case, no matter what the pathology of the case under his care at the time, he is in serious danger of jeopardizing the financial interests of his client and the social welfare of humanity at large.

The veterinarian's examination, especially in sub-

acute or chronic diseases, should invariably include careful palpation of the superficial lymph glands, such as the prescapular, precrural, iliac, and mammary groups. Enlargement of any of these glands to a marked degree is sufficient cause for the application of tuberculin, especially when the enlargement is bilateral in any group.

Localized tuberculous abscesses are very common in the submaxillary, cervical and pharyngeal lymph glands, assuming immense proportions on occasions. If the veterinarian merely lances these and fails to recognize their true significance, he is in grave error. Another very frequent location of a localized tubercular abscess is on the side of the face, just a trifle below the eye and near the facial tuberosity. Abscesses of this nature are always slow in forming; some of them rupture spontaneously, discharge their contents and heal over, only to enlarge again very soon thereafter. There is here a fairly accurate diagnostic point, to wit: these abscesses may rupture and discharge their contents spontaneously. In the cow, abscess formations, not tuberculous, hardly ever rupture spontaneously. Immense collections of non-specific pus are retained sub-dermally in the cow for indefinte periods if they are not molested surgically.

In a dairy practice, abscess formation in any group of lymphatics, not accompanied by definite pathological conditions to which such abscess formation might be attributed, should always be suspected as being tuberculous. While the experienced practitioner can make a reasonably sure identification by macroscopic pus examination, we do not counsel the lancing of abscesses in the region of any lymphatic groups until a negative tuberculin reaction has been seen. If the reaction is positive they most assuredly should not be opened. To

open these abscesses before a positive diagnosis of their non-tuberculous character is made, by means of tuberculin, is not acting upon good judgment. The surgical invasion can have no ultimate value if the case is tuberculous and only endangers other members of the herd with the possibility of their becoming infected from the discharges.

Localized tuberculous abscesses are never a *contra*-indication with regard to the tuberculin test, nor are other localized pus collections of sufficient import to seriously interfere with the intelligent interpretation of the tuberculin reaction. The ophthalmic method has been shown to be just as reliable in the disease in bovines as the ophthalmic mallein application for diagnosing glanders in equines, and it would be the method of choice here. It is more prompt than the subcutaneous method and, besides, provides for a distinct control of each subject tested in the eye which has not been subjected to the tuberculin.

Extensive enlargement of the bronchial and mediastinal lymphatic glands has been known to produce various acute clinical manifestations. One of the alleged conditions resulting from an extensive enlargement of these glands is a thoracic choke, presumably due to encroachment of the swollen glands on the esophagus. No doubt cases of thoracic choke from this cause are very uncommon, because the glandular tumefaction must always assume immense proportions before it can interfere seriously with the limits of flexibility of the esophagus.

In the liver even very extensive tubercular changes rarely produce clinical signs which can be diagnosed as being produced by this disease. Why this should be true we can not explain, unless it be due to the fact

that we are somewhat limited in our diagnostic ability in diseases that affect the liver.

We have seen postmortem demonstrations on cattle which were apparently in the "pink of condition" during life, showing a liver fairly *rotten* with tubercular invasion.

Tubercular involvement of the intestinal mucosa, especially of the terminal portion, is frequently the cause of a persistent, or recurring, diarrhea.

This diarrhœa is marked by the fact that it produces none of the common by-effects of benign or non-specific diarrhœas. Although it may persist for days, there is no apparent abdominal pain nor any distinct sign of derangement in the alimentary tract. The evacuations are evidently the result of the irritation accompanying certain stages of the pathological processes taking place in the hindermost gut.

If a rectal examination is made in these cases it is usually no difficult matter to detect great numbers of pea-sized nodules, many of them undergoing degenerative changes. It is probably as a result of these changes of a degenerative character that the diarrhœa occurs. Mucus, streaked with blood and occasionally blood-clots, can nearly always be detected in the feces in diarrhœa of this form.

Cases of slowly developing ascites in cattle, not referable to any demonstrable causative factor, may always be suspected as being of tuberculous origin. It is barely possible that some of these can be attributed to interference with the portal circulation from extensive tuberculous involvement of the liver. Usually, however, there is a distinct tubercular involvement of the peritoneum which can often be detected by careful rectal examination in the form of numerous nodules or pearls.

Tubercular pericarditis is a form of tuberculosis which we have seen on several occasions when no other clinical signs of tuberculosis were evident. The extensiveness of the invasion of the disease in some of these cases is most astounding when on postmortem examination we attempt to establish a connection between the lesion and the symptoms presented by the animal during life.

Symptoms of tuberculous pericarditis are indefinite until the heart muscle and the valvular apparatus are seriously hampered by excessive effusions or, possibly, adhesions. Cows so affected have exacerbations of dyspnea without provocation; recurring, transient edematous swellings in the anterior portions of the body. Auscultation detects the faulty heart action, and frequently pressure over the heart occasions pain and temporary dyspnea. The left elbow is habitually in an abducted state, and a cough is invariably present. In some cases there is a slight limp on the left pectoral limb.

Tuberculous involvement of an articulation in an extremity is not a rare condition in cows. Most frequently a pelvic limb is affected, and the hip joint is the usual seat of the lesion. There is continued lameness and, later, enlargement of the tissues surrounding the articulation. In this affection there is nearly always a marked enlargement of the superficial lymphatics on the affected side.

Tuberculous mastitis can frequently be diagnosed in the absence of any other symptoms of tuberculosis.

Acute mastitis tuberculous in character is not accompanied by manifestations whose severity coincides with the gravity of the disease; the clinical findings are rather sub-acute. The affected quarter is filled with a floccular, cheesy, milk-like matter. The supramammary lymphatics are tender to the touch, even be-

fore they are much enlarged. The great swelling, tenseness and soreness which we find in the udder in other forms of mastitis is lacking here; the udder is the seat of some swelling, but not much. This swelling is somewhat "doughy" in consistency and not very painful. The body temperature is elevated but little or not at all. We have met with cases of acute tuberculous mastitis of this type in unbred heifers.

Chronic tuberculous lesions in the mammary glands appear in various forms. Very commonly seen is the form consisting of a solid mass of tissue in the glandular substance. To the touch this mass has the feeling of smooth, fibrous tissue firmly compact and sharply outlined.

In other forms numerous small masses, of hazelnut size, can be felt in various parts of the gland. In all cases there is enlargement of the regional lymphatic glands. Abscess formation of tuberculous origin is not uncommon in the substance of the mammary glands. When such abscesses rupture into the lacteal cistern, which is not an unusual occurrence by any means, there can be no question of the infectiousness of the milk.

Tuberculous meningitis occurs in cows but is practically never seen until the patient is *in extremis* as the result of generalized tuberculosis.

Habitual or recurrent tympanites is subject to the suspicion of being tuberculosis. A herd cow who partakes of the same rations as the other members of the herd and has repeated attacks of tympanites with no particular cause, is a good subject for tuberculinization.

Bovine nymphomaniacs always deserve the tuberculin test, before any other form of treatment is instituted.

Neoformations in the testicular substance of males are always to be looked upon as tuberculous until a negative test proves the contrary.

This concludes the consideration of the varieties of tuberculous lesions which are commonly encountered, unexpectedly and yet frequently. Even from a brief outline, such as this one, it can be seen how constant must be the practitioner's vigil, and in what strange clinical disguises localized tuberculous processes will make their appearance.

The control of tuberculosis in dairy herds depends to a very great extent upon this vigilance on the part of the attending veterinarian, which in itself is one of the best arguments against the licensure of empirical practitioners. The treatment of unrecognized local or regional manifestations of tuberculosis is one of the important factors bearing on the spread of this disease.

INCIPIENT TUBERCULOSIS IN FAMILY COWS

Those practitioners who are located in villages and cities of moderate size where ordinances have not yet been passed prohibiting the housing of cows within the corporate limits, have usually a number of clients who keep a cow to furnish milk for the family. If there are circumstances where the attending veterinarian should promptly recognize diseases and conditions which affect the wholesomeness of the milk and the ultimate well-being of the consumer, those circumstances are certainly found here. Those veterinarians who have been close observers and who keep more or less closely in touch with their clientele can name many instances in which sickness in the family and the family cow are closely allied. Sometimes it requires the most exact scientific discrimination and well trained powers of observation to detect the connection; the veterinarian who has the training and is conscientious can, however, make the proper deductions and sift the case down.

To take under consideration the entire field for study on this point would entail almost endless writings. We will take up the one condition which is more common in family cows than is generally presumed, and will confine our remarks to the early stages of this condition.

Incipient tuberculosis in family cows deserves a separate chapter in our text books. Despite the teachings and theories of Koch and other equally eminent investigators, there is a close connection between tuberculosis in the cow and tuberculosis in the family. I say *family,* not humanity in general.

Milk from the family cow and cream from the family cow go to the members of the family as milk and cream, undiluted with milk or cream from other cows or with water. Therefore, the one tuberculous cow, or several tuberculous cows, in a herd of dairy cows are not nearly so dangerous to the ultimate consumer as is the tuberculous family cow to the family using its milk and cream directly and undiluted.

My experience has been that, in every instance of a family using the milk from a family cow with a fairly well marked case of tuberculosis, which has come to my attention, I have been able to satisfy myself that one or more members of that family are already tuberculous or are "getting consumption." (And in many cases it does not take very long before some member of the family begins to show signs of the disease. Sometimes a few months is enough time to infect some members virulently.)

For this reason I say *incipient* tuberculosis deserves a separate chapter in our text books; it is in the incipient stage it must be recognized to *prevent* the harm it might do once it becomes fully developed. Here I would say that the family cow which is more or less regularly attacked by spells of "off feed," by mild, repeated attack of indigestion, especially, if at the same time there are symptoms referable to the mammary glands, is a good subject for the tuberculin test. Usually, in the family cow, the reaction is either *clearly negative* or *typically positive.* This is probably due to the fact that the surroundings and general treatment accorded the family cow are more favorable to the ideal application of the test than is the case with cows in herds.

Histories of the infection of families with tuberculosis through the medium of the milk from the fam-

ily cow will continue to be written until all communities provide rigid rules and regulations to govern the production and sale, and even the *use*, of milk. Every person who keeps a cow for milk should be compelled by law to submit the animal to the tuberculin test at least once every year. Once every six months would be even better. Under present conditions the veterinarian's attention is called to these cases only when the cow is actually sick, and more likely than not has been feeding the family with virulent milk for months past.

INDEX

Abdominal ailments, obscure 52
Actinomycosis 14
Actinomycosis, case reports 18
Afterbirth, retained..... 97
Agalactia, acute, simple..121
Ailments, obscure abdominal 52
Alopecia areata.....101
Amaurosis 25
Ammonia, aromatic spirits of, for tympanites.. 42
Anorexia from obscure causes 52
Anorexia, persistent..... 45
Ante-partum vaginal prolapse 105
Appetite, aberration of... 46
Appetite, depraved 47
Arsenic for liver flukes.. 55
Arthritis, acute 30
Arthritis deformans..... 30
Atresia of the lacteal duct.127
Atropin for eye affections. 22
Atropin for hemorrhage... 28
Azoturia 70

Bleeding from the nose.. 26
Blindness 25
Bloat 40

Cajuput for repelling flies. 29
Cancer of the eye..... 22
Chapped teats.....137
Coccidial dysentery..... 60
Colic 51
Concretions in sub-urethral diverticulum 113
Corneal ulcers..... 21
Cow pox.....135
Cracked teats.....137
Cyst, Douglass' pouch.....115
Cysts, sublingual..... 8

Dental irregularities..... 10
Diarrhea in calves, simple 65
Distoma hepaticum..... 53
Douglass' pouch cyst.....115
Drenching, the proper method of..... 5
Dropsical swellings..... 55
Drugs, action of..... 5
Drugs, administration of.. 5
Dysenteries, differentiation of 63
Dysentery of calves, infectious 67
Dysentery, coccidial 60
Dysentery, enzootic 36
Dysentery—Johnes disease 62

Eclamptic parturient paresis 91
Enzootic dysentery..... 56
Epistaxis 26
Epizootic keratitis..... 19
Eversion of the uterus....108

Eye, anesthesia of..... 21
Eye, cancer of..... 22

Fasciola hepaticum..... 53
Fetal death, symptoms of. 93
Fibrolysin for hygromas.. 33
Fistula, lacteal.....131
Fluke, liver..... 53
Fly repellent..... 29
Foot-and-mouth disease.... 11
Foreign bodies, ingested.. 34
Foreign bodies in tongue. 12
Fractures 31

Hemorrhage following dehorning 27
Hemorrhage from the nose 26
Herpes tonsurans.....102
Hoven 40
Hygroma 32
Hypodermic medication... 6

Impaction of the rumen.. 48
Ingested foreign bodies... 34
Intestinal antiseptic for impaction 50
Intestinal antiseptics for Thurow's disease..... 39

Johnes disease..... 62

Keratitis, epizootic..... 19
Knee, hygroma of..... 32

Lacerated injuries..... 29
Lacteal duct, atresia of..127
Lacteal fistula.....131
Laparotomy 35
Liver fluke..... 53
Liver, foreign bodies in.. 36
Lumpy jaw..... 14
Lungs, foreign bodies in.. 37

Mammitis 123
Mania, puerperal..... 77
Mastitis 123
Medication of cattle, successful 7
Medication, hypodermic... 6
Medication, oral..... 5
Mercuric chlorid for cancer of the eye..... 24
Mercuric oxid for keratitis 20
Milk fever..... 83
Molars, deciduous..... 10
Molars, defective..... 10
Monsel's solution for hemorrhage 28
Mumps 13
Muscular rheumatism..... 68

Nux vomica for impaction. 50

Obstetrical paralysis..... 79
"Off feed"..... 52
Opacities of lens or cornea. 21

Paralysis, acute bulbar.... 73
Paralysis, obstetrical..... 79
Paralysis, senile..... 76
Paraplegia 70
Paresis, parturient..... 83
Parotitis, acute..... 13
Parturient paresis..... 83
Parturient paresis, eclamptic 91
Parturient paresis, recurrent 90
Parturient syncope..... 81
Phymosis 118
Phytolacca for actinomycosis 18
Pica 46
Pneumonia 139
Potassium iodid for actinomycosis 17
Potassium iodid for liver flukes 53

Pouch, intermaxillary..... 8
Prolapse of the uterus....108
Prolapse, vaginal.....105
Puerperal mania..... 77
Puerperal mania—Rabies, differentiation 78

Rabies 94
Rabies—Puerperal mania, differentiation 78
Ranula 8
Retained secundines..... 97
Rheumatism, muscular.... 68
Ring worm.....102

Senile paralysis..... 76
Silver nitrate for corneal ulcers 21
Sore teats 137
Spartein sulphate for pneumonia 142
Staphyloma 21
Sterility 100
Stomatitis 11
Stranguary 113
Surfeit 43
Syncope, parturient..... 81
Synechia 21

Tapping 41
Teats, chapped.....137
Teats, cracked.....137
Teats, sore.....137
Thurow's disease..... 38
Tongue, actinomycosis of. 16
Tongue, foreign bodies in 12
Tongue, woody..... 16
Trocar, use of..... 41
Tuberculosis 143
Tuberculosis in family cows 151
Tuberculosis, incipient....151
Tympanites 40

Ulcers, corneal..... 21
Uterus, eversion of.....108

Vaginal prolapse.....105
Variola 135

Wire cuts..... 29
Woody tongue..... 16
Wright's treatment for bloat 42

Zinc sulphate for keratitis 21

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